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ABSTRACT

A social studies unit and student workbook explore changes in land use that have occurred in the Fenlands of England since the time it was first inhabited. Fens are lowlying land which is partially or completely covered with water. The English Fens are located on the eastern side of the British Isles and cover a total area of about 2,000 square miles. Chapter I reviews the nature and uses of the Fens during pre-Medieval times, from the Stone Age through Roman conquest and Danish invasions. During this time, land use in the Fens changed from infrequent visits by people to gather fuel and to catch fish and birds, to a settled existence combining cultivation and grazing. Chapter II explains that during the Middle Ages, monasteries controlled land use of the Fens and the economy was based upon native products (peat and reeds) and agricultural products. Some reclamation and drainage was carried out, financed by the monasteries. Chapter III shows how large scale reclamation was undertaken from 1700-1850. Drainage and subsequent lowering of the land surface resulted in flooding problems, which pumping technology partially solved. Chapter IV examines modern times in which the Fens have become one of the richest farming areas in England with a highly developed transport system for moving produce. The student workbook contains activities and questions to enhance student comprehension of each chapter. (AV)

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CHANGING LAND USE:

THE FENLANDS OF ENGLAND

A Case Study in Land Reclamation

Kevin Laws

SO 011 002

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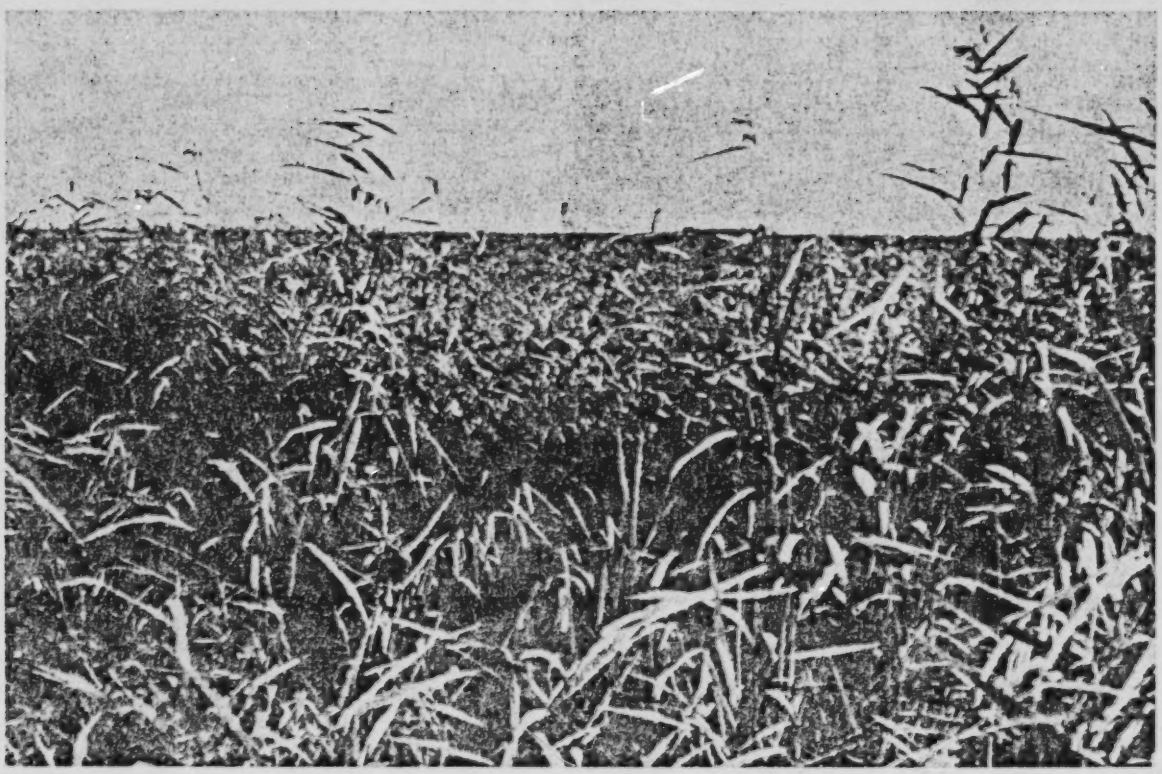

The Fens of England

The English Fends were an untamed world of water, reed and rush until man began to reclaim the land for his use more than three centuries ago.

CHANGING LAND USE: THE FENLANDS OF ENGLAND

Chapter		Page
	Foreword	i
	Introduction	1
1	The Pre-Medieval Landscape - Before 1086	5
2	The Middle Ages - 11th Century to the 15th Century	19
3	Reclaiming the Land - 16th Century to 1850	31
4	Modern Times - The Fens Since 1850	45
5	Unit Synthesis	55
	Glossary	57

ILLUSTRATIONS

Frontispiece.....The Fens of England.....

Figure 1.....The Fens and Some Border Towns.....page 2
in Relation to London

Figure 2.....Silt, Peat and "Island" Areas.....page 3
of the English Fens

Figure 3.....A Stone Age Dwelling.....page 6

Figure 4.....Bronze Age Artifacts.....page 7

Figure 5.....An Iron Age Dwelling.....page 9

Figure 6.....Roman Land Reclamation in the Fens.....page 10

Figure 7...Roman Settlement on the Edge of the Fens..page 11

Figure 8.....The Anglo-Saxon Invasion of Britain.....page 13

Figure 9.....Fenland Monasteries.....page 14
During the Middle Ages

Figure 10.....Fisheries and Salt Pans.....page 18
in the Fens in 1086

Figure 11.....Intercommoning in the Fens.....page 22

Figure 12....The Domesday Settlement of the Fens.....page 25
and Surrounding Area

Figure 13.....Upland and Estuary Towns.....page 26
of the Middle Ages

Figure 14.....The Custom House at King's Lynn.....page 28

Figure 15.....Vermuyden's Scheme.....page 32
for Straightening the Fen Rivers

Figure 16....Pumping Plan: Drain to River to Sea.....page 33

Figure 17.....Steel Column near Whittlesea Mere.....page 35

Figure 18.....Fen Windmill and Canal.....page 36

Figure 19.....Decoy Pond.....page 40

Figure 20.....Ely Cathedral on the Isle of Ely.....page 42

Figure 21..A River Above General Level of the Land...page 46

Figure 22.....Horticultural Land in the Fens.....page 48

Figure 23.....Church and Tulips at Spalding.....page 49

Figure 24.....Settlement and Drainage Pattern,.....page 51
Silt and Peat Lands

Figure 25.....Fenland Transport Routes, 1970s.....page 53

FOREWORD

To the Teacher and Student - Please Read

This foreword is an explanation of this unit in historical geography. It also tells you the way the material is presented and something about the work of the Geography Curriculum Project.

Historical Geography and Sequent Occupance. The idea behind the unit is that man changes the way he uses his environment over time. Some of this change occurs as a result of changes in the physical environment. But most of the changes in land use result from changes in man's culture. If we look at the same area of land in Year A and then come back and look at the same area in Year B, say 500 years later, we will find that the area is not the same. Forests have been cleared, roads built, cities developed, as in the United States. But in other areas of the world, a reverse process is often found: great cities have been abandoned, and the sands of the desert or the growth of the jungle covers the streets where people once worked and played.

The study of changing land use through time is a study of history and geography. Geographers and historians who are interested in changing land use are called historical geographers. As you study this unit, therefore, you are working in an approach called historical geography.

A special approach that you will be using in this unit is called sequent occupance. As man occupies the land, he changes the land and its use. As these change from time to time, one can look back and see certain sequences, stages or definite time periods in which man used the land in a certain way. Look in your workbook on the last page and you will see a chart. On the left side are four stages, or sequences, which you will study in the Fens of England unit. The sequences vary with the area. At the top of the chart are listed certain elements or factors which bring about changes (which are reflected in the different time periods). These factors are cultural factors. Changes in these elements are the causes which bring about the changes in land use in the different periods. Sequent occupance is thus a special type of historical geography in which we study the same area, the changes in culture, and the changing land use in the area by certain time periods.

Concept Acquisition and Transfer. The way this material is presented emphasizes concept acquisition and transfer. Each time period of sequent occupance presents the major cultural factors bringing about changes in land use. These big ideas, or concepts, form the building blocks of the unit. These ideas are presented in a straightforward, narrative style called exposition. The task of the student is to learn these major concepts, so that he can transfer their use to other situations. Technology, for example, does

not just work in the time periods or places studied in this unit, but applies to any other time and place. Thus this unit emphasizes practice and application of the ideas presented in the text. A workbook has been provided to assist you with concept acquisition, practice and transfer.

The Geography Curriculum Project. The Geography Curriculum Project, University of Georgia, offers the teacher of social studies structured materials in geography. These units are topically organized to reflect selected major concepts such as transportation, habitat, place, location, resource, production, spatial arrangement, region, urban settlement, rural settlement, population, and man-land relations.

This unit on CHANGING LAND USE: THE FENS OF ENGLAND by Kevin Laws, provides an explicit unit in sequent occupance dealing with an area of reclaimed land and its environment. The conceptual structure is oriented to helping students understand the past in order to better understand the present use and complexities of such an area. Although it is described as a unit in historical geography, the unit is multidisciplinary in its use of ideas. It thus contributes to the acquisition of social studies knowledge, whether offered in a class called geography, history, or social studies.

This is one of several units in historical geography and sequent occupance written by Mr. Laws for the Geography Curriculum Project. The other units in this series are:

Changing Land Use: Peachtree Street, Atlanta. A Case Study in Sequent Occupance in an Urban Environment

Changing Land Use: The Back Lachlan District of New South Wales, Australia. A Case Study in Sequent Occupance in a Rural Area

Changing Land Use: Cyrenaica, Libya. A Case Study in Regional Decline and Revival

Marion J. Rice
Project Director

April, 1978

INTRODUCTION

The richest and most productive farm lands of England are in an area reclaimed from marsh along the North Sea. The Dutch are famous throughout the world for their polders -- land reclaimed from the sea. But few outside England know about the English Fens, where the marsh land has been diked against the encroaching sea and drained. Seaports have been turned into inland villages, and houses now stand where ships once moored. Marshy ponds have been turned into cropland, and farmers till the deep soil with tractors where fishermen once cast their nets. But these changes did not come about all at once. The Fens themselves took millions of years to form. Turning marsh and shallow water into fields for agriculture did not come about in one vast reclamation scheme, but was the slow work of centuries.

We begin our story about the English Fens by finding their location in eastern England. Then we learn how, so many years ago, the land sank and the Fens began to be formed. But most of the story of the Fens is about the work of man -- how first he lived on the edge of the Fens, and then, slowly but surely, began the hard task of taking the land back from the sea.

In this unit fen has two meanings. The word fen comes from Old English, and means low lying land which is partially or completely covered with water. Thus when we speak of the Fens or Fenland, we might mean a marsh area, as in the early years of land use, or we might mean an area which is now drained and used for farming.

Location

The English Fens are located on the eastern side of the British Isles (Figure 1). The seaward margin of the Fenland is The Wash, which becomes part of the North Sea. The western margin consists of higher land formed from resistant rocks and clays. The total area of the Fenland is about 2,000 square miles. The Fens extend from Lincoln in the north, to Cambridge in the south, a distance of 73 miles; and from Peterborough in the west, to Brandon in the east, a distance of 36 miles.

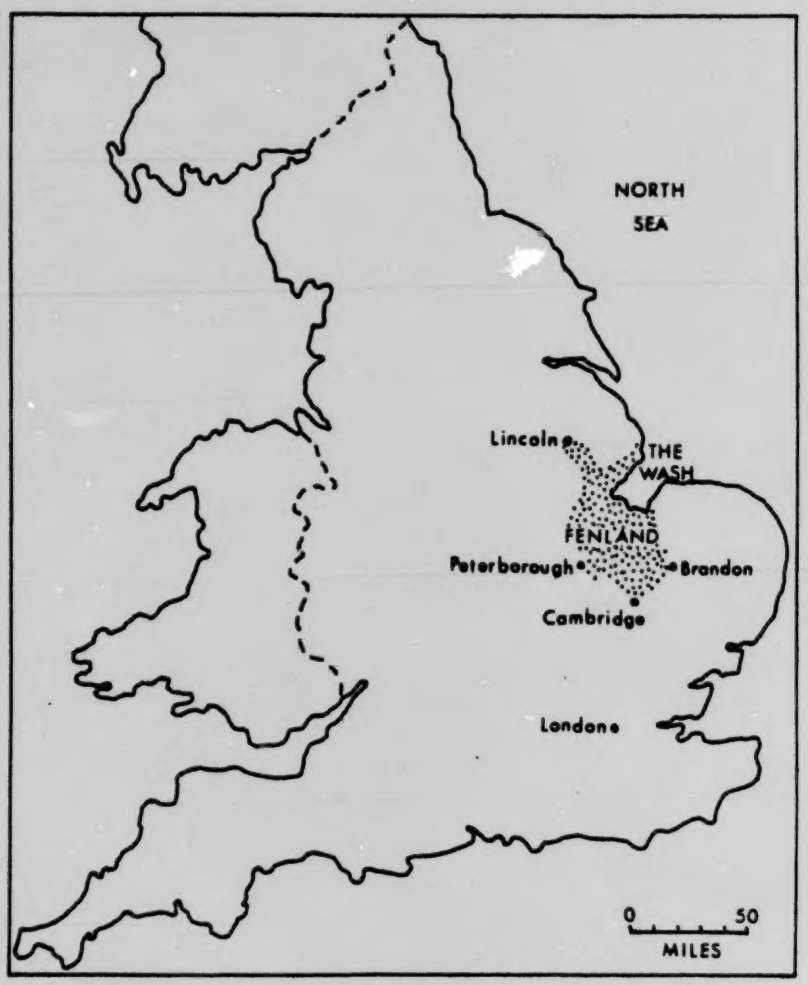

Figure 1. Map of England showing the location of the Fenlands and some border towns in relation to London.

How would you describe the location of the Fens in relation to England?

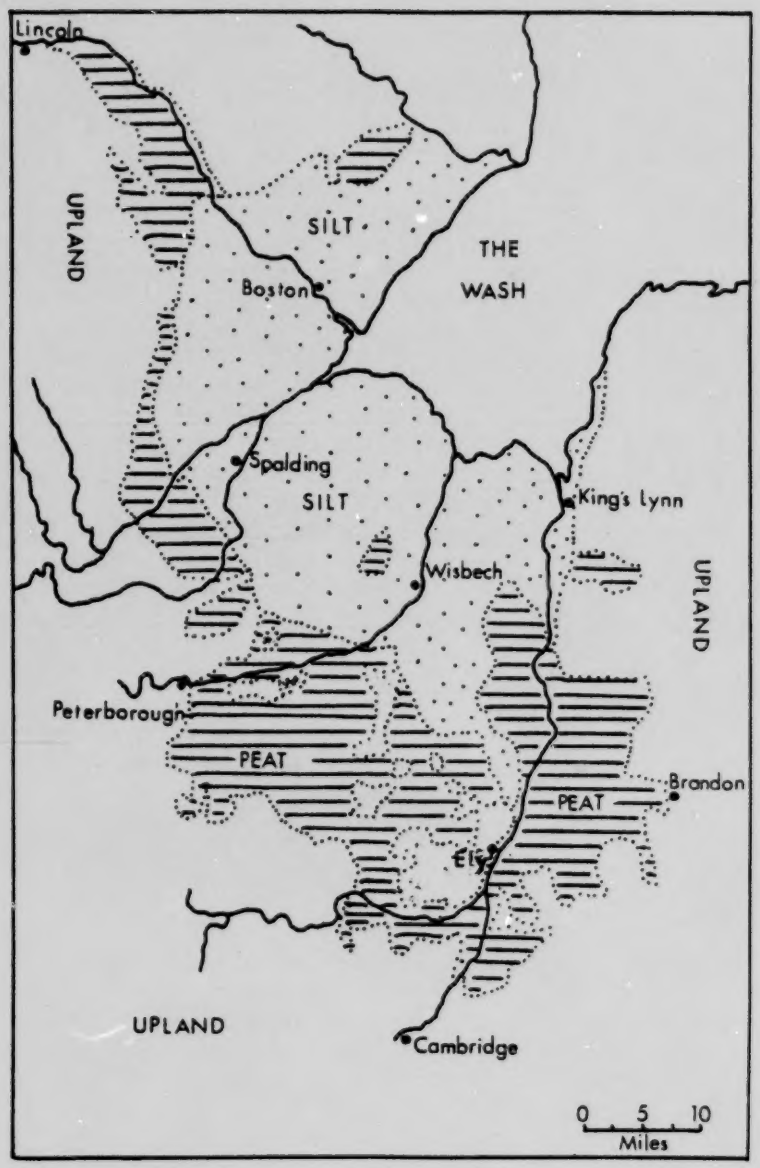

Figure 2. The Fenlands of England showing the areas of silt and peat and the "islands." The upland area which surrounds the Fens consists of relatively resistant rock which stands above the deposited material of the Fenland.

How was the silt area formed? How was the peat area formed? Why is the Wash becoming smaller as time goes by?

Formation

The formation of the Fenland was a long and complicated process. Before the beginning of the Quaternary Ice Age, about two million years ago, there was a line of chalk uplands stretching across what is now the Wash. The British Isles at this time were connected to Europe and a number of rivers cut through the chalk ridge. Over a long period of time the chalk ridge was broken into a line of isolated "humps" by the rivers as they flowed eastwards. Later the land began to subside so that the sea flowed into the low lying country. Thus, the Fenland was essentially a flooded plain, which had for its limits the harder rocks -- chalk to the north and south, and resistant Jurassic rocks in the west. The surface of this flooded plain was uneven, and the higher portions rose above the general level to become "islands." The most important of these "islands" are Ely and March. At the end of the Ice Ages all the "islands" had been capped with clay but the basin characteristics of the area were unchanged. Since that time the basin has been infilled by two processes. On the seaward or eastern side, the fen deposits consist of silts and clays laid down under salt water conditions. On the landward, or western side, the deposits are composed of peat which was formed as the result of sediments deposited by rivers. The area of peat and silt are approximately of equal size (Figure 2).

Within the silt and peat areas three land types are found. Some areas are constantly under water, other parts are seasonally flooded, while the higher areas or "islands" are permanently above the water level except in times of very severe flooding. In the period before the Fens were drained most of the peat land was permanently flooded while silt areas were seasonally flooded.

The Wash is growing smaller at the present time as sediments carried by the rivers Witham, Welland, Glen, Nene, Ouse and Cam and the ocean currents are deposited. The coastline of the Wash which exists today is considerably eastward of the coastline which existed 1,000 years ago.

Unit Overview

The changes which occurred in the Fens since the time of earliest inhabitation will be studied in this unit through the identification of four stages

1. The Pre-medieval landscape -- before 1086
2. The Middle Ages -- 11th century to 15th century
3. Reclaiming the land -- 16th century to 1850
4. Modern times -- since 1850

11

CHAPTER 1

THE PRE-MEDIEVAL LANDSCAPE - BEFORE 1086

The year 1086 marks an important stage in the history of England. It was in this year that the Domesday Inquest was made. Since this time some records of English life have been available. However, in the pre-medieval landscape very little evidence exists to provide a clear picture of what the fens were like. For this reason it is not possible to look at the very early development of the area analytically as will be possible in later chapters.

The Pre-Medieval period was marked by a series of "ages" and periods during which invading groups changed the way of life and the land use in the Fens.

The periods to be considered in this chapter are:

(a) The Stone Age

(b) The Bronze Age

(c) The Iron Age

(d) The Roman Conquest

(e) The Saxon Invasion

(f) The Danish Invasions

The Stone Age. To 2000 B. C.

During the Stone Age the Fenlands were not permanently occupied. The area around Peterborough to the west of the Fens was occupied by a group who lived in pit-dwellings. These dwellings consisted of an excavation of about three feet in depth, varying from six to twenty feet in diameter. A tree trunk sup-

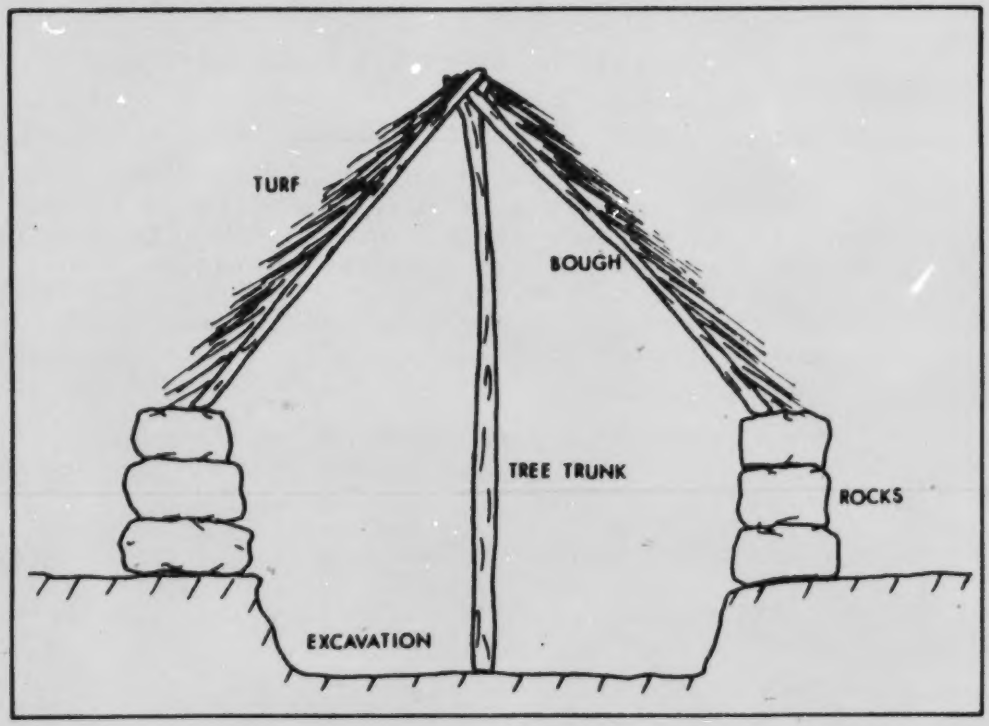

Figure 3. A Stone Age Dwelling

How was such a dwelling constructed? What materials were used to build such a dwelling? Where were dwellings like this found?

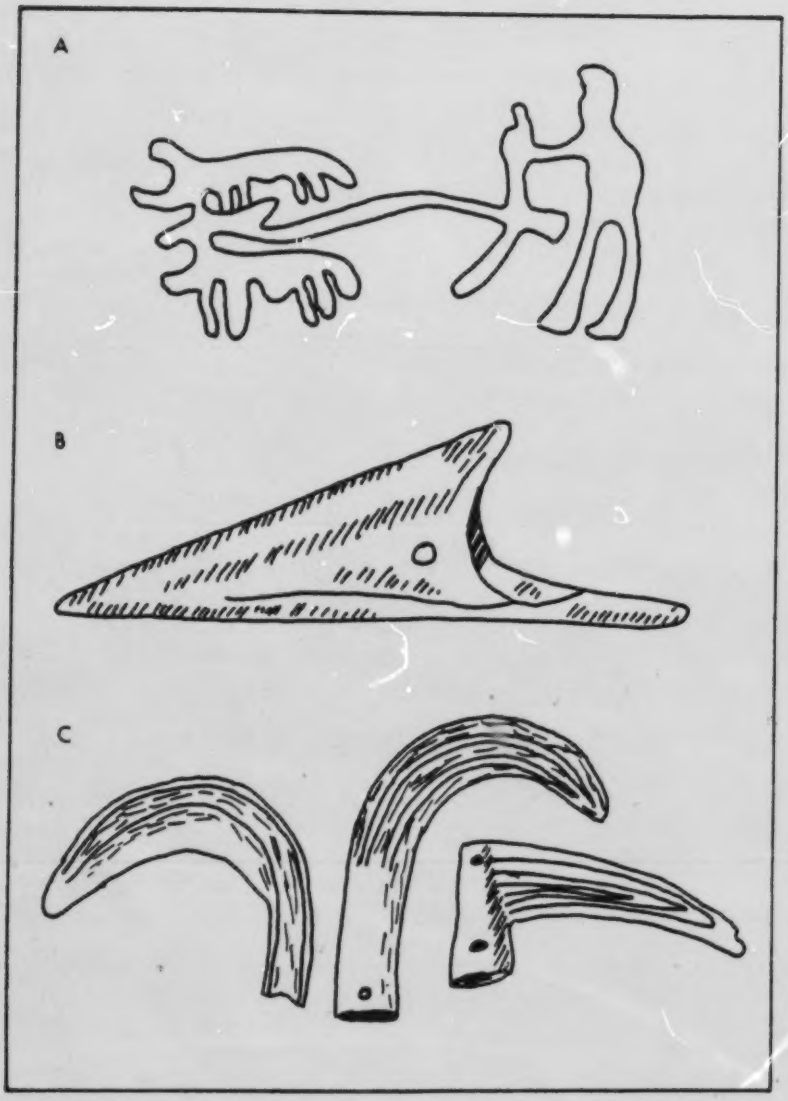

Figure 4. Bronze Age Artifacts

A. A Scandinavian rock carving of oxen pulling a plough guided by a farmer. A similar technique was probably used in the higher areas of the Fens and surrounding countryside. The plough was made from a tree and when extra weight was needed to make a furrow the ploughman stood on the projecting end of the crosspole.

B. Late in the Bronze Age ploughshares like this were attached to the base of the wooden plough to make the job of cutting through the soil easier.

C. Bronze sickles such as these were of great value to the farmer at harvest time. Early sickles were fastened to the handle by rivets. Later sickles had a socket into which a wooden handle was fitted.

ported the roof which was made from large boughs covered with turf which was obtained from the surrounding land (Figure 3).

These people were farmers who had domesticated sheep, pigs, goats and oxen. They used dogs to guard the animals from robbers and wild beasts. They grew some wheat and barley. They had simple tools made of stone, wood, bone and horn.

It is likely that these people ventured into the peat areas of the Fens in search of fish and wild fowl, consisting of ducks, geese and herons, but they did not live permanently in the Fens.

The Bronze Age. 2000 to 500 B.C.

There is evidence that the "islands" of the Fenland were inhabited by Bronze Age man. These people came to the area from Europe, bringing with them their skill of making bronze from copper and tin. The low lying and marshy nature of the Fens would seem to present an unpleasant place to live. However, the "islands," or areas of higher land surrounded by marshes, provided natural protection from sudden attack, and the lack of heavy timber cover made clearing relatively simple. The ready supply of fish in the Fens provided an important source of food for these people.

They built huts and lived a pastoral existence. The animals they raised were similar to those of the Stone Age. Since these people had the skill to weave cloth, sheep were now important for their wool which was plucked off the animals by hand.

Late in this age the horse was introduced from Europe. It was a much smaller animal than the horse of today, but was useful for pulling carts. The cart during this period developed from a rough sledge with rollers to a vehicle with spoked wheels which was to survive until Roman times.

Agriculture was becoming more important. Bronze was used to make a plough point and the plough was pulled by oxen. The plough did not turn the soil but only made a straight furrow. A bronze sickle was used to harvest the crops of barley and wheat (Figure 4). More people inhabited the Fens during this period than at any other time until the Middle Ages.

The Iron Age. 500 B.C. to 100 A.D.

People with the knowledge of the use of iron came during this period to the British Isles from the Rhone Valley. Iron was much easier to make than bronze because no alloy was required, and the stronger iron implements made forest clearing much easier. This led to a movement of people from lower lying, relatively treeless areas to the forests of the chalk uplands. Thus, there

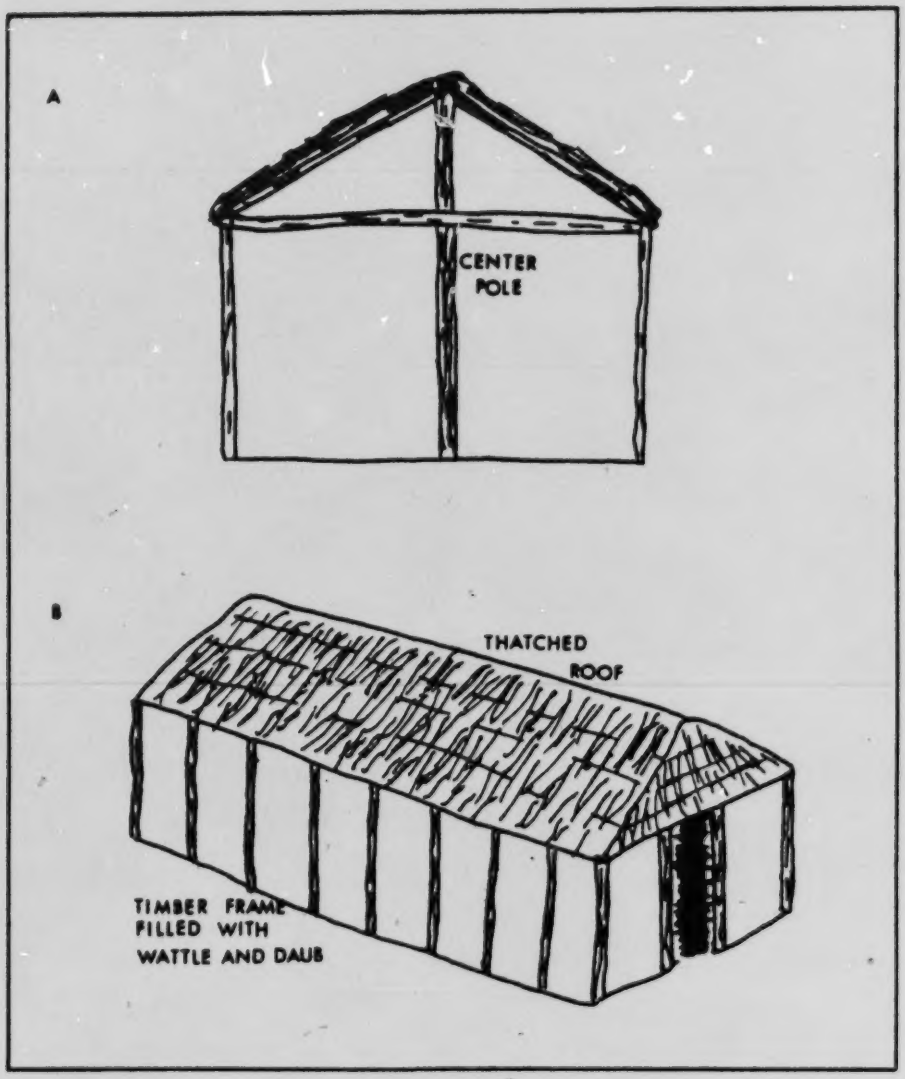

Figure 5. An Iron Age Dwelling

Why would you not expect to find a building like this in the Fens? What is wattle and daub? What was the roof thatched with?

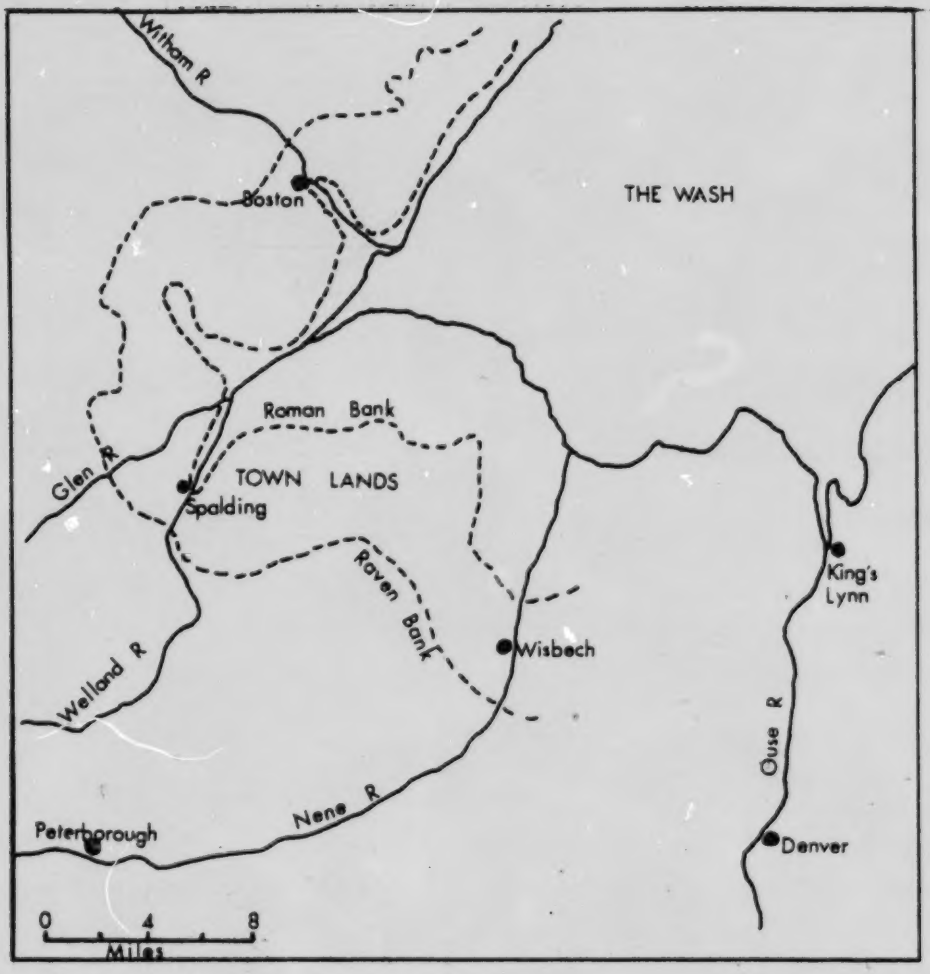

Figure 6. Roman Land Reclamation in the Fens

The Roman Bank and the Raven Bank are believed to have been constructed by the Romans. The Roman Bank indicates the coastline during Roman times. The Raven Bank led to the reclamation of a zone called Town Lands upon which many settlements were established.

The Romans constructed a causeway across the marsh from Peterborough to Denver and there also built the Car Dike, a canal, which ran from Lincoln to near Peterborough.

Why has the shoreline moved since Roman times? Why were very few settlements located between the Raven Bank and the Uplands?

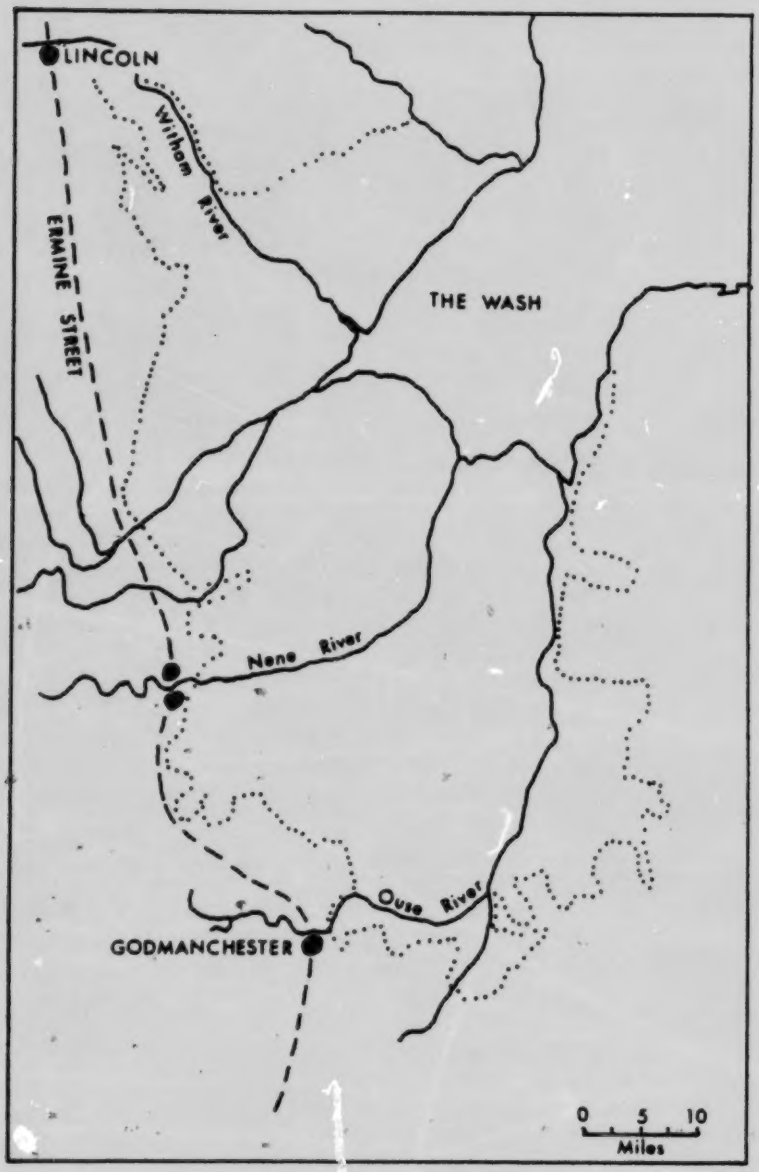

Figure 7. Roman Settlement on the Edge of the Fens

Why do you think the Romans established towns near the major rivers in the area? Why did Ermine Street not run closer to the coastline?

was a movement of people from the marshy Fenlands to the surrounding higher ground. Iron Age Britains built houses with timber frames and walls of wattle and clay. The thatched roofs were supported by a center pole (Figure 5).

Wheat was the principal crop but oats, rye and barley were also cultivated. Cows were an essential part of the economy. They provided milk, meat, hides, and were used to pull ploughs. They were used also to measure wealth since there was no coinage. Sheep were raised for meat and wool and pigs and goats were also kept. Farm implements improved greatly and included a slasher and an iron-tipped spade.

The Roman Conquest. 50 B.C. to 450 A.D.

The Roman Conquest in Britain overlapped the Iron Age. Although the Romans did not settle the Fenlands in great numbers, they did receive the support of the Celtic tribe Iceni of the southern Fens in their campaigns against tribes in southeastern Britain. A Roman fort was established at Lincoln in 47 A.D.

Roman technology was used to reclaim some of the seasonally flooded areas of the Fens, particularly in the eastern silt areas. They constructed coastal sea-banks and inland dikes and in this way made much more land available for cultivation. It seems likely that the Romans transported food grown in the Fens to parts of England where their soldiers were camped. They also built a causeway from Peterborough to Denver across the marshy peat Fens to allow farmers to transport agricultural products to the market towns (Figure 6).

The system of Roman roads did not enter the Fens although Ermine Street, which ran from London to the Humber River, passed close by the western margins of Fenland. The Romans established towns where Ermine Street crossed the major rivers. Godmanchester (near present Huntington) was established on the south bank of the Ouse. Two towns were established on the Nene River not far from present-day Peterborough. Lincoln was situated on the Witham River (Figure 7).

During Roman times some of the Fenland was occupied by cultivators, who tilled the soil in small fields. The region of maximum farming activity was upon the silt lands and on certain islands of the middle Fens. The raising of livestock was still very important to the Fen economy.

The Saxon Invasion. 500 A.D. to 1086 A.D.

In the fifth century A.D., groups of Germanic people began to invade Britain. These were the Saxons, Angles and Jutes who merged with the original inhabitants to form the Anglo-Saxon

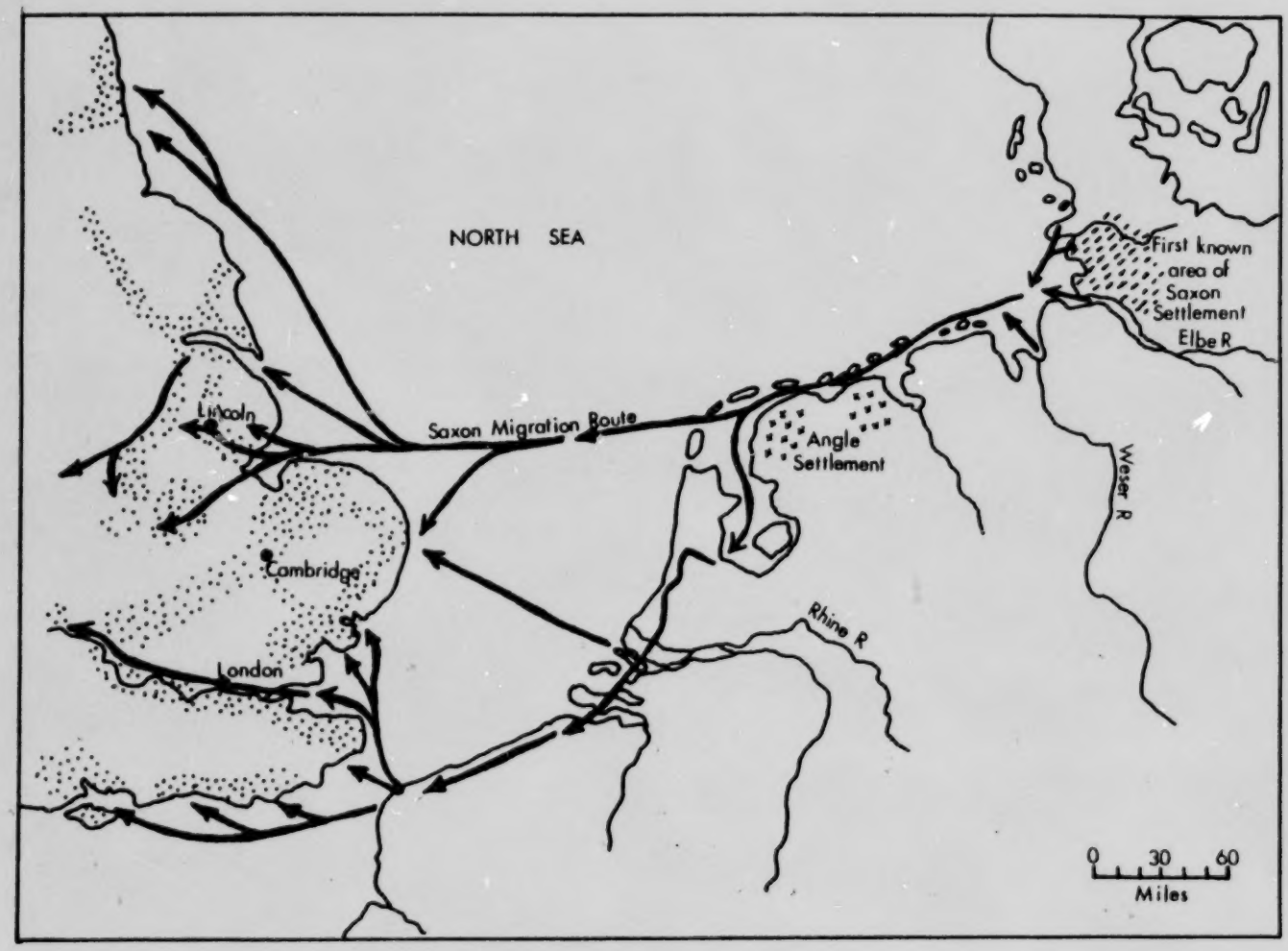

Figure 8. The Anglo-Saxon Invasion of Britain

Angles and Saxons from the western coast of Europe moved into Britain about 550 A.D. The dotted parts of Britain indicate those areas settled by Anglo-Saxons by 550 A.D. Almost all of Britain was occupied by these groups by 626 A.D.

Describe the location of the first known Saxon settlement. Describe the location of the area of Angle settlement. What areas of Britain were settled first by the Angles and the Saxons? Why?

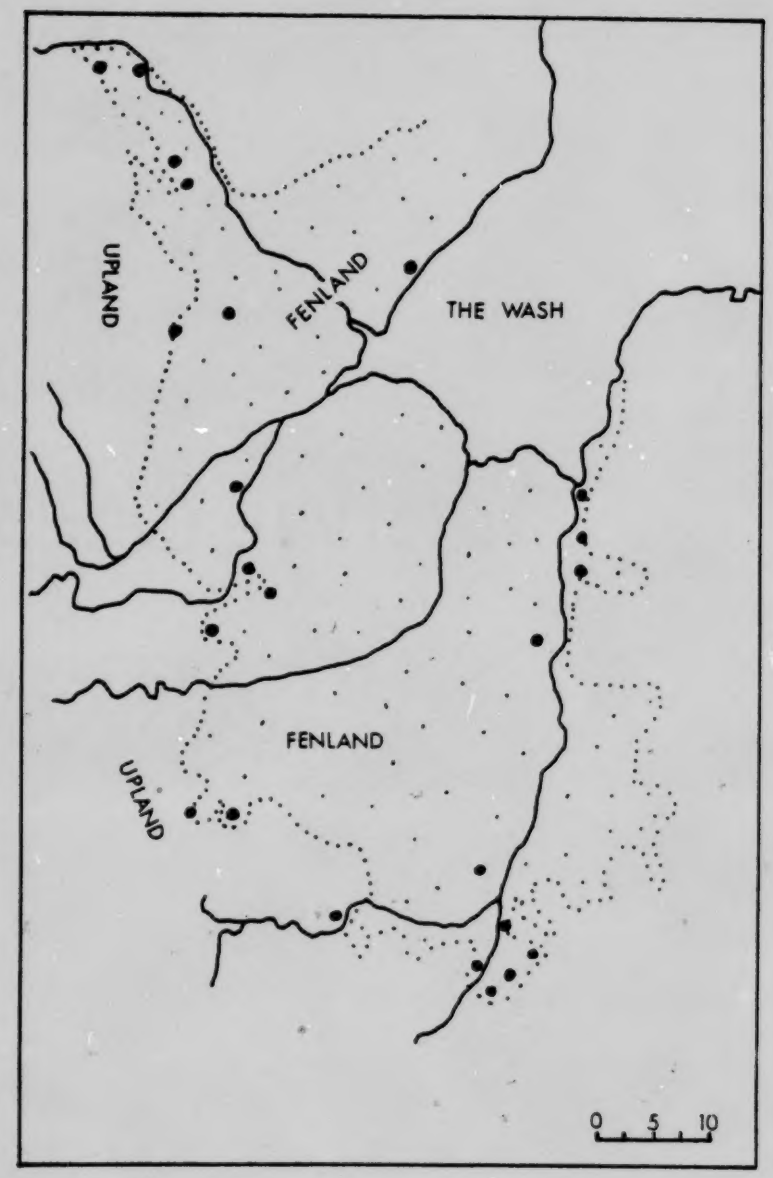

Figure 9. Fenland Monasteries During the Middle Ages

Why did monks find the margins of the Fenland and the Fen islands suitable for the establishment of monasteries?

people. Many of the invaders entered Britain by way of the Fen rivers, such as the Ouse, Nene, Witham and Welland (Figure 8). Most of the invaders were farmers looking for new land. They were people who considered that forested land, when cleared, provided the best agricultural land. Very few of them settled in the Fenland where life went on much as it had before the Roman Conquest. The land which had been reclaimed by the Romans reverted to marsh when they left. The local inhabitants did not have the technical knowledge necessary to drain the land or to maintain the sea-banks and dikes constructed by the Romans. The Fens at this time consisted of marshy land, much of which was covered by water. People living in the Fens needed five times the amount of land that the people in the uplands needed to survive. This helps explain why the region was lightly populated. The Anglo-Saxon invaders considered the marshy conditions unsuitable for farming and preferred the higher forested areas on which to settle.

During this time Christianity was spreading over England. This was to have an important impact on the Fenlands as the isolation offered by the marshy environment attracted many monks to the area (Figure 9). These people were looking for places to live a life of solitude and contemplation and, between 600 A.D. and 800 A.D., many monasteries were established on the "islands." Peterborough was established on the edge of the Fens in 655, Thorney in 662, Ely in 673 and Crowland in 716.

Some of the monks wrote descriptions of the region at that time. The Venerable Bede declared

> Ely is in a country of about six hundred families, in the nature of an island, enclosed with either marshes or waters, and therefore it has its name from the great plenty of eels taken in those marshes.
>
> When the Ely folk desired stone they went on board ship because the country of Ely is on every side encompassed with the sea or marshes, and has no large stones.

An eighth-century monk, Felix, tells how

> There is in Britain a fen of immense size. There are immense marshes, now a blackpool of water, now foul running streams, and also many islands, and reeds, and hillocks, and thickets.

When St. Guthlac came to Crowland he thought the place was infested with devils. The stories of devils show what sort of a mental and environmental barrier the Fens presented to the people at this time. Felix reports on an island

> which oft-times many men had attempted to inhabit,

but no man could do it on account of manifold horrors and fears, and the loneliness of the wild wilderness.

Not all the horrors were imaginary. The Fenland was an unhealthy place "oft-times clouded with moist and dark vapours." Ague and malaria with their hallucinations made the life of the fenman very miserable.

The Danish Invasions. 9th Century.

During the ninth century groups of Danes began to spend the winter in Britain. This was a prelude to systematic settlement. Between 866 and 880 A.D., the "great heathen army" of the Danes was reported to have surrounded the Fens.

They did not settle the Fenland in any great numbers, but the Danes did raid many of the Fen monasteries. In 870 A.D. the Danes "came to Peterborough and burned and beat it down, slew abbot and monks, and all that they found there. And that place which was before full rich, they reduced to nothing." They also plundered Crowland and destroyed Ely.

In the mid-10th century there was a revival of the monasteries. The Danes had turned their attentions elsewhere and many religious houses were founded and refounded upon the Fen islands. Ramsey was founded in 969, Ely was restored in 970, and Thorney in 972.

In the late tenth and early eleventh centuries the Fenland suffered once more at the hands of the invaders. In 1010, after the Danes defeated an English army, they ravaged the Fens for three months.

During Anglo-Danish times the Fenland was sparsely settled. Although much of the region was marsh and water, it was not without value. Already some activities of Fenmen, such as fishing and fowling, were well organized and controlled. In many instances the local monasteries regulated the division of the land and the marshland activities. Most of the people lived upon the "islands" found throughout the Fens.

Summary

For much of the period before the Middle Ages the Fens were used by European invaders as a route to the more attractive higher lands of the interior of England. Although the Romans had begun to drain some marshy areas, the improvements were not maintained when the Romans left.

The inhabitants of the Fens lived upon "islands" where they grew crops and raised animals. The marshy areas were very

important for these people because it was from such areas that fish and fowl were obtained.

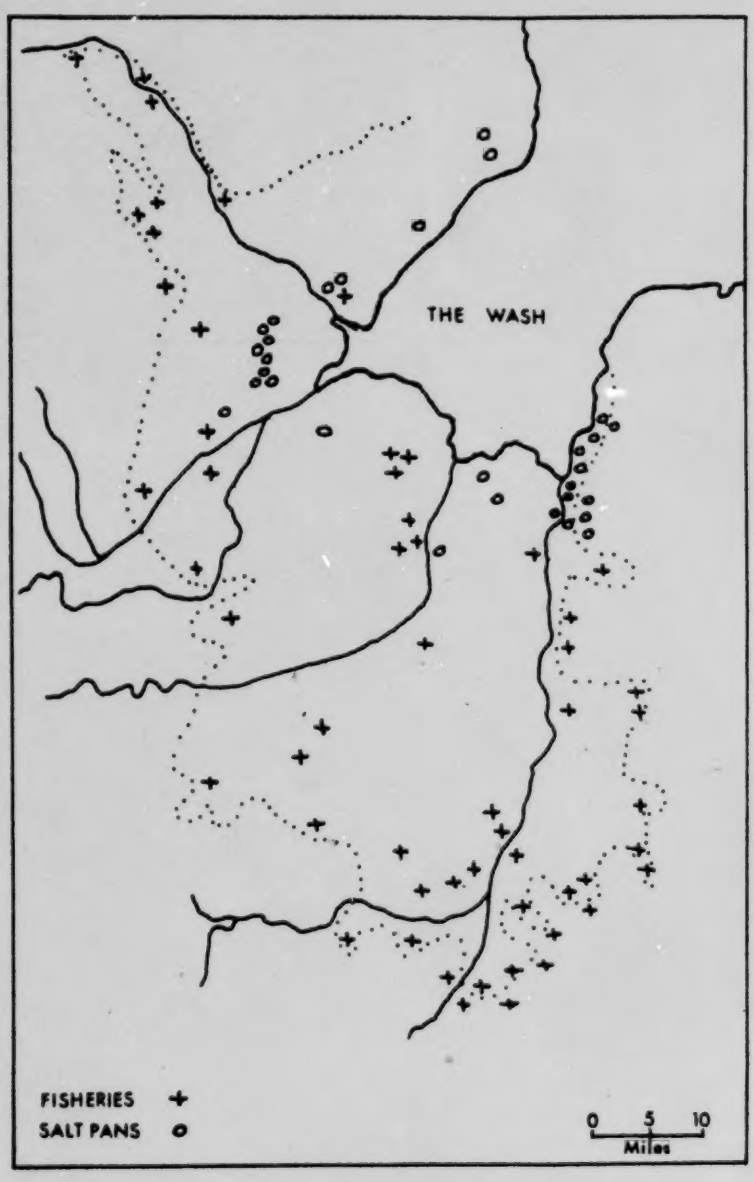

Figure 10. Fisheries and Salt Pans in the Fens in 1086

Why do you think fishing was important in areas that were not adjacent to the major rivers? Describe the location of the Domesday salt pans. Compare the locations on this map with Figure 6.

CHAPTER 2

THE MIDDLE AGES - 11th CENTURY TO THE 15th CENTURY

More is known of the Middle Ages and succeeding periods than is known of the Pre-Medieval Period. For this reason the information will be organized topically rather than chronologically as in the preceeding chapter. You will study the changing land use and way of life of the people in the Fens through the analysis of six important cultural elements in the landscape. These elements are:

(a) Technology, the level of development of the people

(b) Economy, the activities by which people make a living

(c) Social Organization, the way people are formed into groups

(d) Population, the number of people living in an area

(e) Settlement Pattern, the arrangement of people living on the land

(f) Transport and Communication, the means by which people interact

For the purpose of this study the Middle Ages will be considered to have begun in 1086 and concluded during the 15th century. The year 1086 marks the date of the Domesday Inquest which was a survey of English lands made by order of William the Conqueror. William had arrived from Normandy in northwestern France and had defeated King Harold in 1066 at the Battle of Hastings. In an attempt to find out what sort of country he now controlled, William had the Domesday Book compiled so that he could determine what taxes to levy. The Domesday Book contained information about the size of properties, the area under crops and the number and type of stock throughout southern Britain. This information forms the basis of the first accurate picture of life and land use in the Fens.

Throughout the five centuries of the Middle Ages life and land use in the Fens were not subject to foreign invasion. Although minor changes occurred, the description of the region in 1150 by Hugo Candidus, a monk of Peterborough, is basically the same as that given by Michael Drayton in 1622. Hugo wrote

> From the flooding of the rivers, or from their overflow, the water, standing on unlevel ground, makes a deep marsh and so renders the land uninhabitable, save on some raised spots of ground, which I think God set up for the special purpose that there should be the habitations of His servants who have chosen to live there..... Peterborough is founded where the marsh begins on its eastern side, to extend for sixty miles or more. This marsh however, is very useful for men; for in it are found wood and twigs for fires, hay for the fodder of cattle, thatch for covering houses, and many other useful things. It is, moreover, productive of birds and ponds abounding in fish. In all these things the district is most productive.

Technology

During the Middle Ages technology developed to such an extent as to allow the reclamation of some marshland. Most of the work of draining the land was organized by the monks who were concerned with making land useful for agriculture. Inhabitants of Fenland became skilled drainage engineers and were able to build large sluices - floodgates that helped control the flow of water in a stream or river. Sometimes a new channel was built to divert the water in another direction. Fen and sea banks were also constructed at this time and they helped prevent flooding. These efforts at reclaiming did have some success but they were only carried out on a small scale at the local level within the silt area of the Fens.

Agricultural techniques also developed, but the tools used did not change dramatically from those used in earlier times. Wheat was grown on the drier siltlands, especially on the monastic estates. Many Fenlanders grew flax and hemp. Pastoral farming was very important in the Fenlands. Sheep and cattle were raised in barns during the cold winter and fed on hay cut from the marshes. During the summer months the animals were pastured on high ground and small islands. Moving the animals was often very difficult and sometimes boats had to be used.

Economy

The nature of the terrain of the Fenlands produced a number of occupations and practices which existed throughout the

Middle Ages. Life was very different from medieval communities on the upland regions of England.

The usefulness of the Fens varied. Some parts were always flooded, others were flooded only in winter, and others were completely dry in ordinary seasons. Consequently, the activities of the region fell into three main groups:

1. The marsh - fishing and fowling; the gathering of reeds and rushes; and the making of salt along the seashore

2. The intermediate zone - mainly the production of hay, the grazing of animals, and the cutting of turves

3. The dry zone - the cultivation of crops

The Marsh. Fishing and fowling, the gathering of reeds and rushes, and the making of salt were the most important activities of the marsh area. Fishing was valuable to both the monasteries and villages. Nets, baited hooks, and pikes were used to catch the great variety of fish and eels. Eels were particularly important because they were used as a form of currency. Often rents were defined in terms of thousands of eels or in "sticks" of eels, each stick containing twenty-five eels. (Figure 10)

Reeds, rushes and birds. The produce of much of the Fen, particularly the peat-lands, seems to have consisted of reeds, rushes and sedge. These products were valuable as building materials, particularly for thatching roofs.

Large numbers of many varieties of birds lived among the reeds and rushes. They provided a livelihood for many inhabitants of the region. In the twelfth century, Thomas of Ely wrote

> There are numberless geese, coots, dabchicks, water-crows, herons and ducks, of which the number is indeed great. At mid-winter, or when the birds moult their quills, I have seen them caught by the hundred, and even by the three thousands. Sometimes they are taken in nets and snares as well as by bird lime.

Salt pans. There were two sources of salt in the Middle Ages, either inland brine springs or coastal pans for obtaining marine salt by evaporation. The silt region provided the ideal physical conditions for salt production because the sea was continually building up a salt-marsh along the shore. Peat was used as the fuel to evaporate the brine. (Figure 10)

Meadow, Pasture and Turbary of the Intermediate Zone. During the 11th and 12th centuries the area of meadow was not

Figure 11. Intercommoning in the Fens

The arrows begin at villages and the arrowheads point to areas which were used for the grazing of cattle. Note that in a number of instances, long distances were involved.

Why were the Fens a suitable area for grazing material? At what times was grazing possible? Why were the villages located on the Upland, Islands or Townlands?

great. However, the area under meadow grew as land was reclaimed from the marshes. Normally, meadows were dry in the summer. Winter floods made the meadows richer for the following summer. Meadows provided hay and pasture for animals. Some meadows were surrounded by water. Men went out daily by boat to milk the cows that were pastured on these meadows. Turbary, obtained from peat bogs, was another important product from the intermediate zone. The turves which were cut were used as fuel, a building material, and in the repair and raising of river embankments in order to prevent flooding.

Crop Cultivation in the Dry Zone. Organized agricultural activity was reported in the Domesday Book. The marshes surrounding monasteries offered the promise of becoming good and fertile arable land. Sometimes these areas were reclaimed by the building of embankments. However, much of the Fenland was more valuable in its natural state as pasture because animals were very important to the Fen economy.

On the islands and higher ground crops were grown. Cereals such as corn, wheat, barley, oats and rye were important. Pulse, beans, peas and flax were also grown. In many localities winter flooding destroyed much of the cropland.

In many descriptions of the inhabitants of the Fens during the Middle Ages, much importance is attached to the marsh dweller.

> The true Fenlander could be called neither an agriculturalist nor a shepherd. He was a fisherman of sorts, a wild-fowler, and a gatherer of natural resources such as berries and reeds.

and

> In that dreary region a half-savage population lead an amphibious life, sometimes wading, and sometimes rowing, from one islet of firm ground to another.

These accounts are not incorrect but it must be remembered that they only describe one type of life style in the Fens. It is important to remember that farming and especially the raising of animals formed an important part of the economy.

Social Organization

The manorial system was a feature of Medieval Britain. The King of England controlled all the land. He granted sections of it to noblemen and to the church. Common people, that is, those who were not nobles, worked the land. Not all common people had the same status. Some were villeins who lived in villages

and worked land that had been granted to them. Until the 14th century they paid for the use of this land by working for the lord on his land. After that time rent was often paid in money which left the villein free to work his own land full time. The serf was a person who did not have the use of any land. He worked for the nobleman or the church. Until the 14th century he was a slave to his lord but after that time he was receiving a small wage for his services as well as his keep.

Each monastery, manor and village had rights related to the natural resources of the region. So much of the Fens was held in common that supervision was essential. Common land or marsh consisted of areas which could be used by all village inhabitants. Overseers were appointed to deal with the many offences committed on the marsh. Fishing rights were closely regulated. In many places fishing was allowed only at specific times and for certain periods of time. Neither freeman nor bondman was allowed to sell rushes outside the limits of the manor except with the permission of the lord. Strangers were not allowed to take anything from the fen without first being granted permission.

Pasture rights were very important to the Fenland economy because of the number of animals and the scarcity of suitable land. Pastures held by monasteries were carefully controlled. The right to pasture was not the same in all classes. Two kinds of villages existed. There were those villages which exercised their rights by ancient custom and without payment. Commoners from these villages were allowed to send any number of cattle at any time of the year into any part of the area. Other villages were allowed to pasture their cattle on payment of a definite rent and sometimes the numbers of cattle were restricted. Frequently one piece of marsh served as common pasturage for a number of villages (Figure 11).

Population

During the Middle Ages the eastern midlands were part of the area of greatest population density in England. However, within this densely populated area, considerable variations were found. The following table indicates that the physical conditions experienced in the Fens lowered the number of people living in the region:

Domesday Population 1086

	Upland adjacent to Fens	Southern Fens	Northern Fens
Recorded Population per 1000 acres	15	5	2
Plough Teams per 1000 acres	5	1	¼

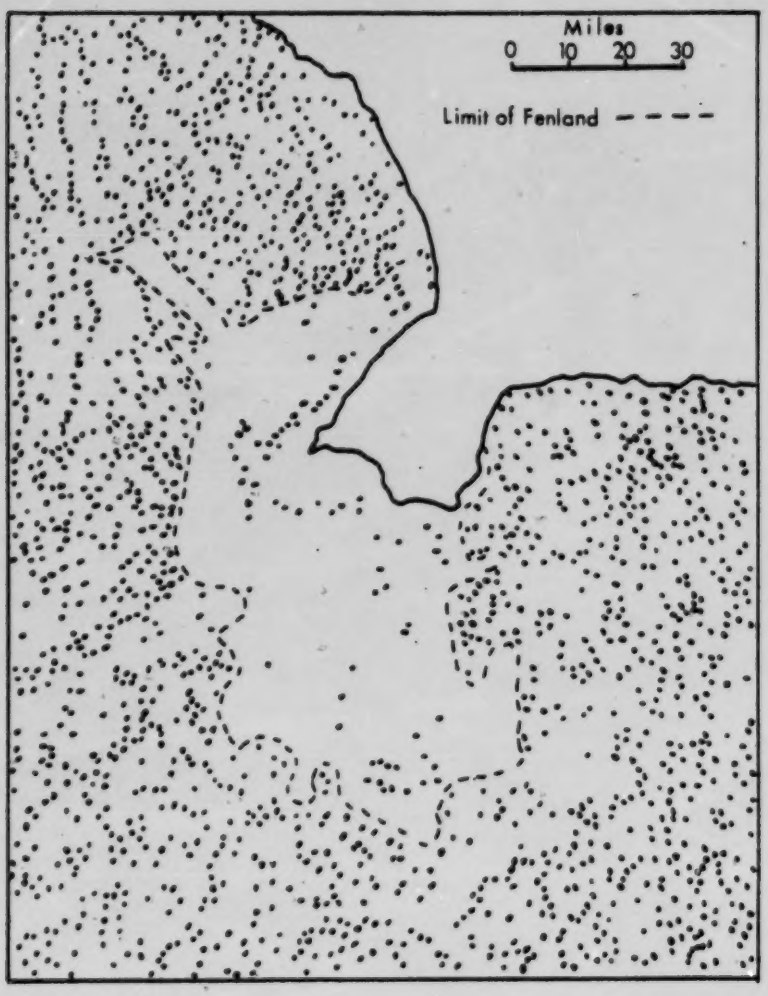

Figure 12. The Domesday Settlement of the Fens and Surrounding Area

Each dot represents a village.

Describe the settlement pattern indicated by this map. Note specifically the location of settlements in the Fens. Why do you think this pattern existed at this time?

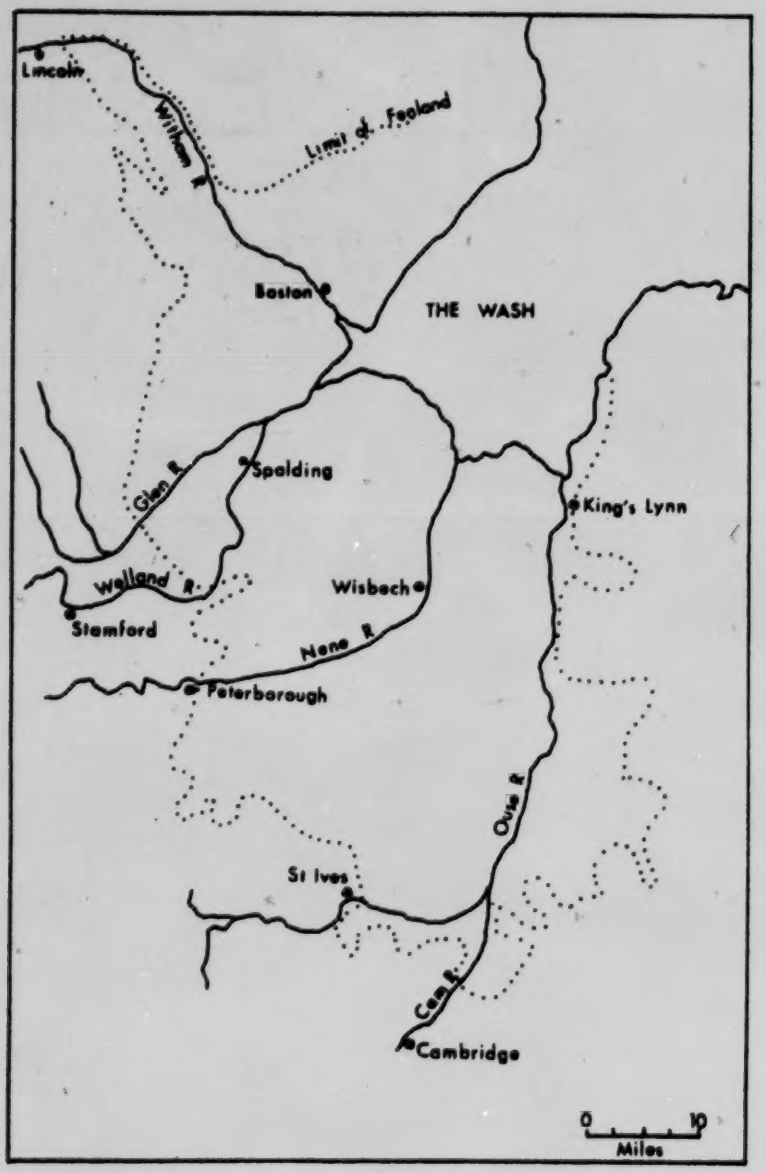

Figure 13. The Location of Upland and Estuary Towns During the Middle Ages

What is meant by an estuary town and an upland town? Why did such a pattern of towns develop?

Although these figures do not represent the total population of the Fens, it can be seen that the adjacent upland areas contained over three times as many people than the southern Fens and over seven times that of the northern Fens.

Settlement Pattern

The pattern of settlement which existed in 1086 remained similar throughout the Middle Ages (Figure 12). The distribution of villages reflected the topographical differences of the Fenland. Settlement was not found on the peat area because the soil provided no stable foundations on which to build. Even those portions that escaped winter flooding were subject to an annual heaving motion as the swelling peat absorbed more and more water. Consequently, not one Domesday village was located in all the area. The settlements in the western Fens were all upon islands.

In the silt area, bordering the Wash, the land was more solid than the peat, and offered better opportunities for continuous settlement. The distribution of village sites in Domesday times shows the silt region as a belt of uniformly occupied territory joining the uplands to the north and south. This line of villages was along the alignment of the 11th century coast. Infilling has resulted in the eastward movement of the coastline since that time.

On the inland edge of the Fenland lay another line of settlements located on the eastern margins of the Uplands.

Transport and Communications

Great stress is laid upon the inaccessibility of the Fenland during the Middle Ages. Although a number of major rivers flowed across the landscape, much of the Fens was marshland during this period. Marsh is one of the most difficult of all the physical barriers on the earth's surface. The sea can be traversed by boat; the topography of the land may be overcome; but marsh is neither land nor water and presents one of the great original barriers to movement. It was the marshlands that were inaccessible.

The rivers of the Fenland formed commercial avenues that ran through the heart of the region and provided numerous outside contacts. The Witham, Welland, and Glen, Nene, Great Ouse and the Cam were used by merchant ships carrying the produce of many countries. It is interesting to note the situation of certain towns in relation to the Fenland streams (Figure 13). Border Towns were located on the edge of the Fen and the Upland area. Estuary Towns were found in the zone where salt water from the sea met freshwater from a river.

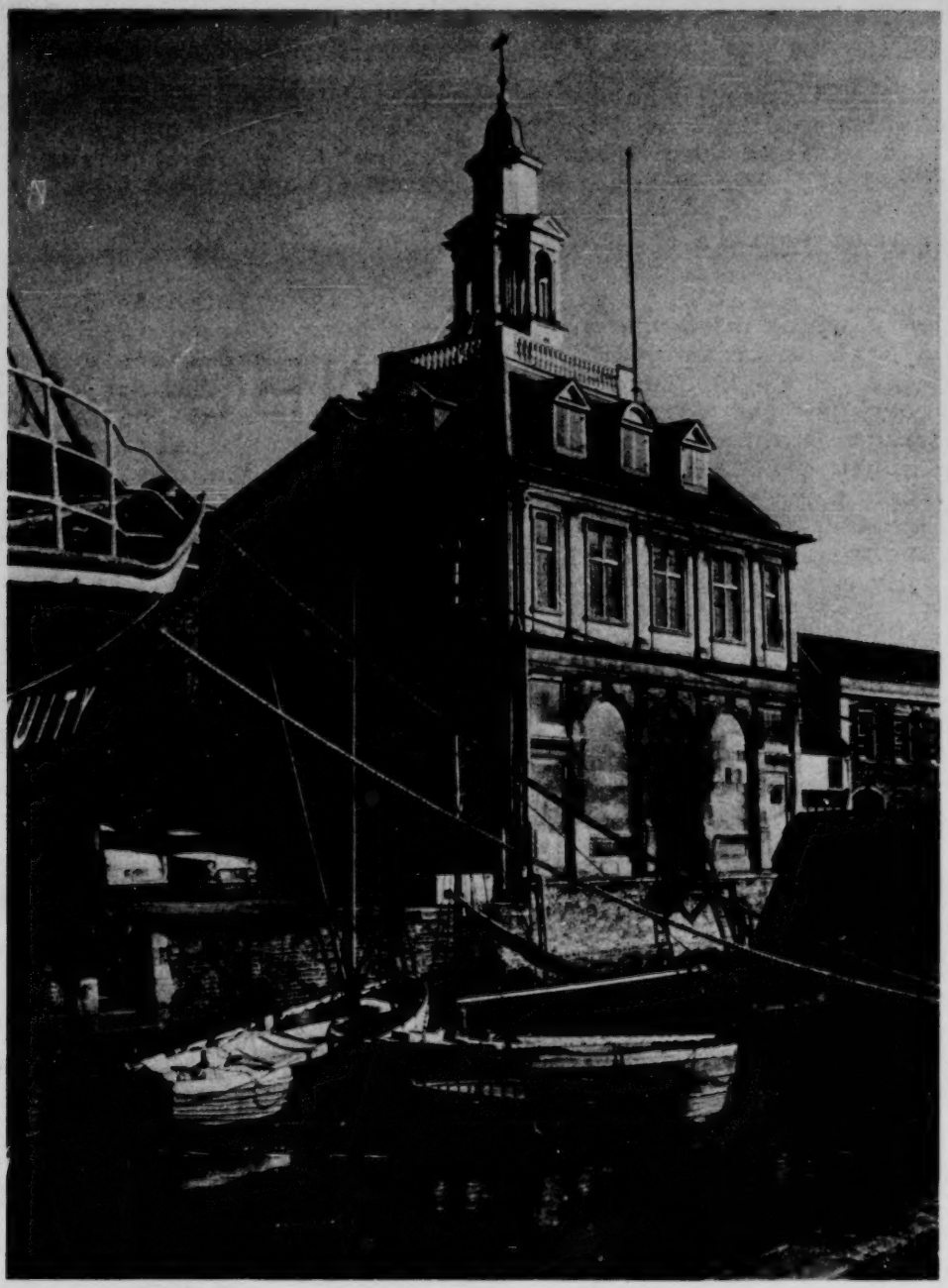

Figure 14. The Custom House at King's Lynn

Although this building was constructed in 1683 the town had developed as a major port well before that date. King's Lynn had extensive water communications during the Middle Ages to an extensive, rich arable area supporting a dense population. Corn was a very important product traded through the town.

River	Border Town	Estuary Town
Witham	Lincoln	Boston
Welland	Stamford	Spalding
Nene	Peterborough	Wisbech
Great Ouse	St. Ives	King's Lynn
Cam	Cambridge	

These towns were significant to the Fen economy and were of even greater importance to southeastern England. King's Lynn was a major wheat export port for the producing area of Norwich (Figure 14). Boston was a principal port for the export of wool to France and Italy, and Lincoln was the center of a major wool producing area during the 14th century.

Minor waterways linked the major rivers so that trade could be carried on with the upland area. Major products exported from the Fens included corn, wool, turf and fish. Timber and stone for building purposes were among the major imports. Most of the monasteries had channels built from rivers so that their produce could be shipped out. Bridges and causeways were constructed for road transport. The island of Ely had three causeways constructed during the 12th century. However problems arose over the maintenance of the bridges and causeways and frequently man-made channels broke their banks and flooded the surrounding areas.

Further problems were experienced at the mouths of the rivers. The low gradient of the river bed and the strength of the incoming tide from the Wash led to the silting up of river mouths. On numerous occasions rivers were rerouted at their mouths both by siltation and the construction of new channels.

Summary

The Fenlands in the Middle Ages were sparsely populated but were by no means poverty stricken. Much of the land was controlled by the monasteries which closely regulated the use of the natural resources. The physical conditions of the Fenlands were such that a variety of products could be obtained from the area. These included marsh products, such as reeds and fish, pasture hay and peat, as well as agricultural products. The silt lands presented conditions that were more favorable to settlement and the peatlands were generally avoided.

The central location of the Fenlands in relation to the rest of England and the rivers which flowed through the area made it the focus of trade with Europe.

Although some marsh land was reclaimed during this period it was done on a small scale and was usually associated with large monasteries.

CHAPTER 3

RECLAIMING THE LAND - 16TH CENTURY TO 1850

During the period from the sixteenth century to the nineteenth century many changes took place both in the Fenlands and throughout England. In the fifteenth century the manorial system began to change and disintegrate. By 1540 the great holdings of the monasteries had been dissolved as a result of Henry VIII and his disagreement with the Roman Catholic Church. The period began with increases in the number of independent yeomen farmers and concluded with enclosure and the amalgamation of small holdings into larger farms. Perhaps the greatest change in the Fenland during this period was the introduction of large scale reclamation and draining projects which made a great deal of fertile land available for cultivation and grazing.

During the last three decades of the sixteenth century severe flooding occurred throughout the Fens. Many people were "greatly impoverished and likely to be overthrown and utterly undone if some speedy remedy be not had and provided." The inhabitants of the Fens stressed the need to prevent summer flooding. However, villages had no money to carry out the large scale projects necessary to prevent summer flooding. Until this time the monasteries had provided the money needed for the construction of channels and sluices while the villagers provided the labor. When the monasteries were closed and their lands were redistributed the source of capital upon which drainage schemes depended disappeared.

Technology

The technological developments that took place from the 16th to the early 19th centuries had far reaching effects. Major advances were made in the methods of drainage. However, drainage led to the problem of the shrinking of the land surface which resulted in flooding problems. The development of mechanical pumps helped overcome this problem.

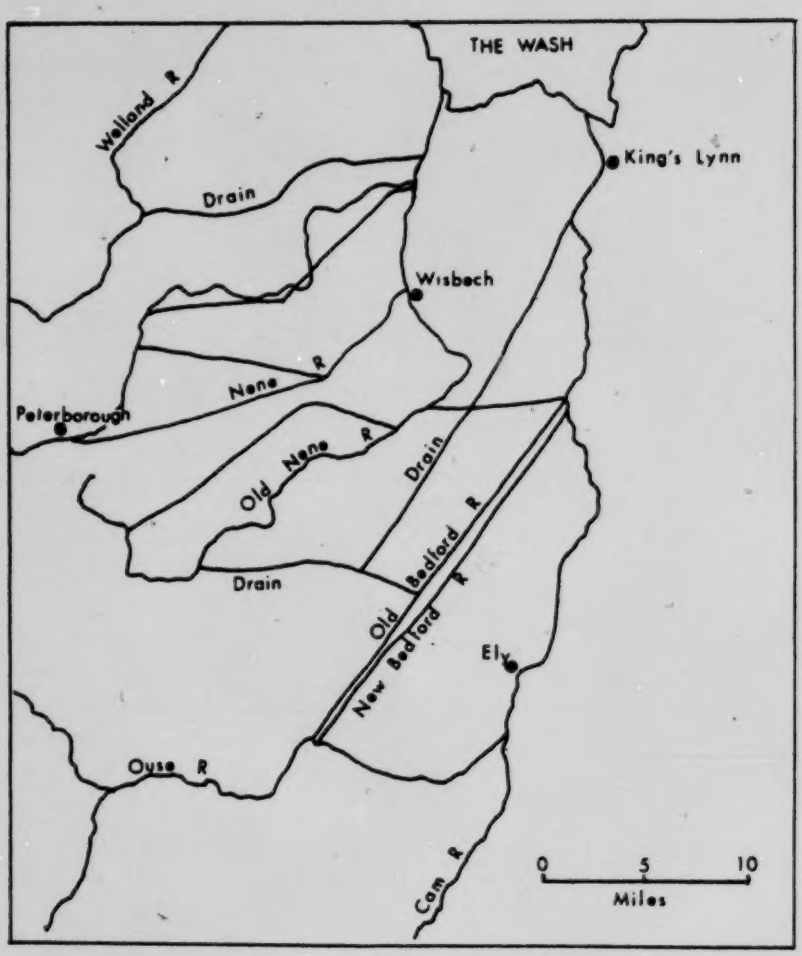

Figure 15. Vermuyden's Scheme
for Straightening the Fen Rivers

Much of this work was carried out during the seventeeth century; for example, the Old Bedford River was constructed in 1631 and the New Bedford River in 1651.

What did Vermuyden think would happen when river courses were straightened? Did this happen? Why or why not?

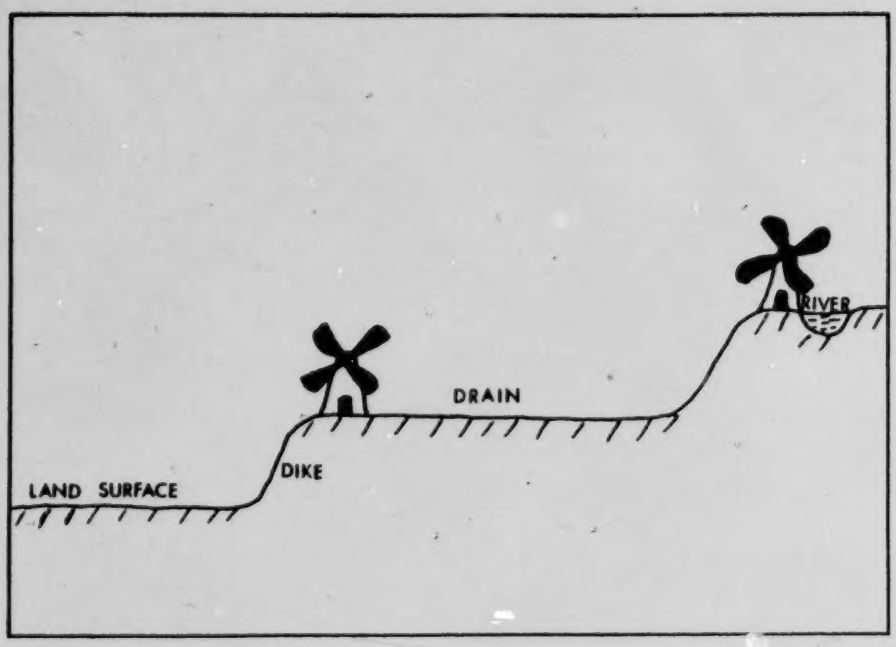

Figure 16. Water was Pumped from Dike to Drain, from Drain to River, and from River to Sea

Why was the pumping of water necessary? What technological development was of great importance for large scale land reclamation schemes?

The remainder of this section will look at each of these developments.

Drainage Methods. The major technological changes that took place in the Fens during this period were related to the reclamation of the land. In the first half of the seventeenth century two methods of draining the land were proposed. The first method was suggested by the Dutch engineer, Vermuyden. His proposal was to shorten the courses of the major rivers by a series of cuts and channels in order to increase the gradient of the stream. This would allow the stream to flow faster and would help carry the sediment out into the Wash (Figure 15). The second proposal was to deepen the existing waterways. This was to be done by building higher banks and then ensuring that the channel was kept clean of reeds and rushes. Vermuyden's proposal was accepted and cuts, drains and sluices were made. The sluices were necessary to keep out the strong tides which slowed the flow of the rivers near their mouths.

During the eighteenth and nineteenth centuries attention was turned to the tidal rivers and their mouths as well as the drainage of the land. Vermuyden's proposals had not included plans for dealing with the mouths of the rivers. He assumed that the natural gradient of the streams would ensure satisfactory flow to the sea. However, the Fen rivers have a very low gradient for up to forty miles from their mouths and consequently the currents were sluggish. This led to the deposition of material in the tidal areas, and fresh waters had more and more difficulty in forcing their way to the sea. In the nineteenth century new channels were made at the mouths of the rivers and sluice gates were constructed to control the tides in an attempt to solve this problem.

The Shrinking of the Land Surface. Associated with these problems was a more fundamental difficulty. None of the drainage engineers realized that as the Fenland was drained the surface of the peat land would become lower. This was due to the shrinkage of the peat as it dried and also to bacterial action. The better the drainage the more rapid the wastage. Soon after the completion of reclamation many of the main channels flowed at a level higher than that of the adjoining surface as the land shrank (Figure 16). Even the minor drains soon flowed at a lower level than the channels into which they discharged. The same problem of shrinkage occurred on the silt zone also but to a lesser degree. The differential shrinkage between the silt and the peat areas only accentuated the situation, particularly because the silt land was nearer the sea. The rate of surface lowering can be seen in the following instance.

In 1851 a steel column was sunk into solid clay near Whittlesea Mere so that the top of it was level with the surface. By 1860 almost 5 feet of the column stood above the ground, by

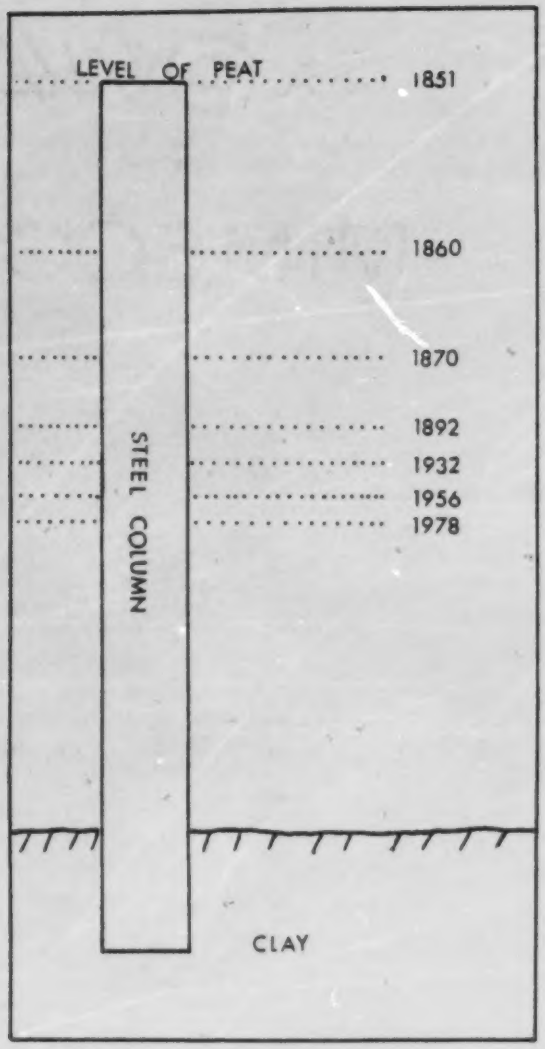

Figure 17. Sketch of Steel Column
near Whittlesea Mere

Why did the level of the peat "shrink?" Describe the rate of shrinkage of the land that has taken place in the Fens.

Figure 18. Fen Windmill and Canal

Today many of the Fen rivers and canals are used for recreation. Note how flat the land is in the background of this photograph.

Does this landscape remind you of another country? Where is it and why does it make you think that? What were some of the difficulties of using windpower for pumping water?

1870 almost 8 feet, by 1892 over 10 feet, by 1932 almost 11 feet. By 1956 over 12 feet of the column stood above the surface level and there is still ten feet of the peat remaining (Figure 17). Generally the ground shrunk rapidly at first and then shrinkage became slower.

Pumping Engines. The only remedy for these difficult conditions was to pump the water from dike to drain, from drain to river, and from river to sea. The introduction of pumping engines was the critical factor that prevented most of the Fens from being re-inundated. Early pumps were worked by horses but the windmill was the only realistic way to drain the Fens on a large scale. At first there was much opposition to the use of windmills. It was argued that mills disturbed the main drainage system, drained one locality at the expense of others, and interferred with watercourses by pumping mud into them. However, in 1727 an Act was passed to allow local landowners to use windmills (Figure 18).

Hundreds of windmills were constructed. In 1748 there were over 250 windmills in the Middle level alone. However, the windmill was at the mercy of wind, gale, frost and calm. It was never powerful and it soon ceased to provide a satisfactory solution to the problem of clearing water from the drains. As the peat surface continued to shrink the windmill became less and less effective.

In 1805 Arthur Young made the following comments about his visit to the Fenlands:

> I was shocked at the sight of this desolation.... the total ruin of the whole flat district must ensue. The Fens are now in a moment of balancing their fate; should a great flood come within two or three years, for want of an improved outfall, the whole country, fertile as it naturally is, will be abandoned.

This pessimistic prediction did not happen. Improvements in the river outfalls and the advent of the steam engine led to better draining. From 1820 steam engines were gradually introduced. Joseph Glynn used two steam engines of 60 and 80 H.P. to drain 25,000 acres of Deeping Fen. By 1838 Glynn summed up his work in the Fens as follows:

> I have not only caused two blades of grass to grow where one grew before but I have had the pleasure to see abundant crops of wheat take the place of the sedge and the bulrush.

Economy

The improvements in draining were paralleled by improvements in agricultural practice and agricultural conditions. The numerous scattered individual strips of land which went to make up a farm in the Middle Ages became consolidated during this period and areas were enclosed or fenced for individual use. The crops grown on the enclosed Fen were numerous and varied: wheat, oats, barley, turnips, beans, peas, flax, cole seed, hemp, chicory, mustard and woad. Agricultural products and techniques varied according to the type of land used--silt or peat.

In the silt zone there were two kinds of land and two kinds of management. The newer marsh lands which had been reclaimed from the sea and defended by walls were mainly cultivated, although some grazing was carried out. Crops of wheat, oats and beans were grown on the ploughed land, which also carried flocks of sheep. On the higher ground, where the villages stood, were luxuriant grazing lands.

On the spongy peat Fen the technique of paring and burning was introduced in the middle of the seventeenth century. In 1791 Arthur Young described this practice:

> It is scarcely possible, profitably to bring boggy, moory, peat soils, from a state of nature into cultivation, without the assistance of fire. In these Fens, the original surface is rough and unequal, from great tufts of rushes, etc. called hassocks. Some persons cut them with spades, others with the plough. Paths for the horses were to be cut by hand, and the plough made on purpose, called a hassock plough, cut generally much beyond the line of its draught. But opinions are that handwork is the cheaper; in either case the hassocks are dried, heaped, burnt, and the ashes spread. After this they go over it again with a very complete and very effective tool called a Fen-paring plough, the furrow of which is burnt.

The usual rotation of crops that followed the burning was: 1) cole seed, 2) oats, 3) oats, 4) wheat, followed by several years of seeding for pasture. There were objections to the practice of paring and burning but the practice persisted until the nineteenth century.

In the nineteenth century, as the peat land began

to shrink, the clay subsoil came nearer to the surface. It was some areas ploughing brought the clay to the surface. It was found that the clay mixed with the peat produced good results. Clay gave solidity to the soil and prevented too rapid evaporation. Peat gave carbon. In areas where the clay was too deep for the plough to bring it to the surface a technique known as "claying" developed. Trenches about two feet wide were dug across fields until clay was reached. The clay was spread for four yards on either side of the trench. Under this system trenches were dug eight yards apart. Although the cost of this practice was high it was a process which only needed to be done once. Wheat, oats, cole seed and turnips were grown in areas which had been reclaimed in this way.

The improved drainage and agricultural practices led to prosperity in the Fens by the early nineteenth century. Although there was still room for improvement, the Fens became known as a "fruitful and salubrious country" and contained soils "amongst the first class."

Social Organization

The way of life of the Fen inhabitants changed greatly during this period. In this section the changes that took place in village and farm activities will be described first. Then the new responsibilities brought about by the draining of the land will be discussed. The final part deals with the new source of money which replaced that once provided by the monasteries.

Changes in Village and Farm Activities. After the beginning of the sixteenth century the organization of villages and the major purpose and aims of the farmer began to change. In the earlier period the objective of the Medieval village and the manorial farms had been to supply food for the local community. As nearby towns began to grow, farm activity changed to producing large surpluses for new markets on the fringes of the Fens. Many of the old village communal farms were broken up into individual farms. Associated with this was the introduction of money payments both for the rent of the land and for labor.

As the manorial system fell to pieces, the structure of the work force changed to specialization. The blacksmith, carpenter and wheelwright, instead of being manorial servants became independent craftsmen, either doing the required work for wages, or finding their own materials and selling the finished article.

In many places the traditional occupations of the Fenland still continued. Dairymen stocked the surrounding

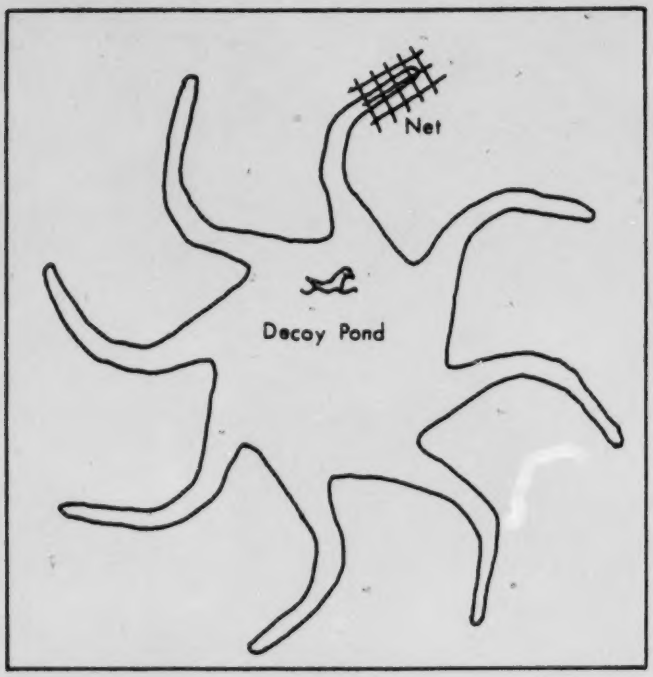

Figure 19. Decoy Pond

Ponds like this were constructed by fowlers. Tame birds were placed on the pond and trained to swim up one of the "pipes." Nets were stretched across the "pipe" and when wild fowl followed the trained birds the net was lowered, trapping them. Hundreds of birds could be caught at one time using this method.

Why were such techniques used to trap birds?

Fens with their cows during summer, and used hay to feed them during the winter. Cattle were frequently brought into the Fenland to be fattened. In marshy areas the chief subsistence of the Fenmen was fish and fowl, together with milk, butter and cheese, and bread which they made from the spring wheat that grew in small patches. Peat was used for fuel and reeds for thatch. In the waters fish and fowl were still to be found. Nets were still used to catch fish, but the fowler's occupation was revolutionized by the drainage of the area. Firearms were used and the birds became less numerous and less tame. Fenmen had to resort to trickery to entice the birds into their nets. One method which developed during the eighteenth century was called the decoy pond (Figure 19). This was a few acres of water on which were kept a number of tame ducks trained to swim up channels. Each channel was covered by netting and the wild ducks followed the tame ducks up the tunnel net where they were caught.

New Responsibilities. During the Middle Ages the responsibility of maintaining, repairing and constructing channels, drains and sluices was divided among many groups. At least twelve different groups of people were responsible for clearing and repairing one channel which ran no more than ten miles. Divided responsibilities gave many opportunities for evasion of responsibilities, and led to the eventual destruction of many of the drainage projects which had already been carried out.

In 1531 King Henry VIII established a Commission on Sewers which had powers to hold court to determine the defaults and obligations for the maintenance of drains. In a modified form, this commission remained the basis for successive commissions until the nineteenth century. Unfortunately, the courts adopted the view that the commission had no power to make new drains or banks. It was only to regulate and maintain the old economy.

Even during the nineteenth century administrative problems still existed. The major difficulty was still due to the lack of any single authority along the course of a river, and the absence of cooperation among existing authorities. Added to this was a conflict of interests among many of the authorities: some were concerned with the maintenance of navigation, others with the clearing of the channels and others with the maintenance of the banks.

The Financing of New Projects. The introduction of new large scale land reclamation and drainage projects was made difficult by the dissolution of the monasteries. During the

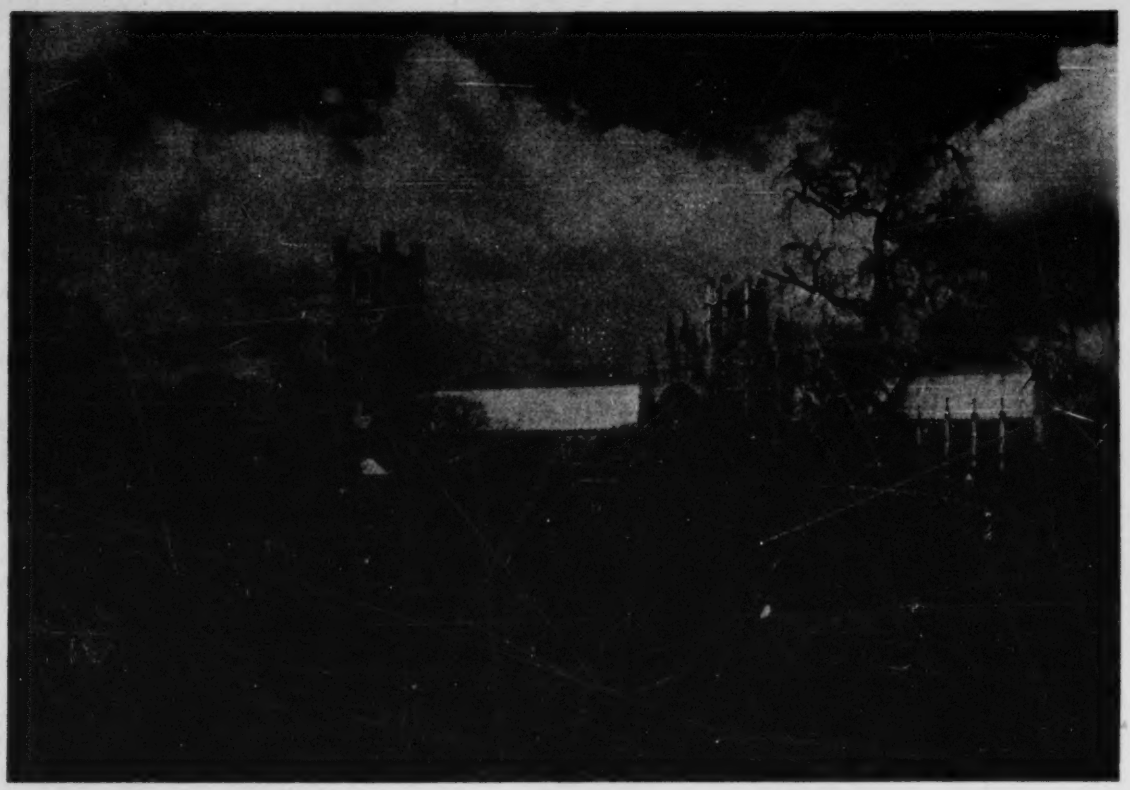

Figure 20. Ely Cathedral on the Isle of Ely

A church built at Ely during the seventh century developed into this fine cathedral. Note how the building is constructed on high land and is surrounded by grazing land.

Why would such a location be selected for the construction of a church? See if you can find out the style of architecture of the church.

Middle Ages monasteries had provided the capital for new projects and the Fenmen provided the labor. When the monasteries disappeared so did ready access to capital. Two new figures appeared in the seventeenth century to fill the gap: the "Adventurer" and the "Undertaker." The Adventurer provided the money to finance a drainage scheme. The Undertaker actually organized the reclamation work. This system led to problems because Adventurers were granted some of the reclaimed area, which was already owned by Fenmen who carried out the traditional activities of fishing and fowling on it. Frequently, dispossessed Fenmen took up arms and "broke down the sluices, laide waste the lands, threw down the fences, spoiled the corn, demolished the houses and forcibly retained possession of the land." Usually the Adventurer won out in the long run.

Population and Settlement Pattern

During this period the distribution of population was not very different from the pattern which had developed in the Middle Ages. The silt lands were more densely populated than the peat areas but as reclamation schemes were successfully completed on the peat lands more people moved into these parts, however the villages were still to be found on the higher silt lands. Although the land owned by monasteries had been redistributed, many beautiful cathedrals remained (Figure 20).

The population density was highest in the south where it ranged from 100 to 150 per square mile. The northern Fens had a population density ranging between 50 and 100 per square mile. This reflects the greater productiveness of the southern Fens which could be noted even during the Middle Ages.

During the seventeenth and eighteenth centuries a large number of new settlers arrived from Western Europe. Some of these people had been employed to assist in the reclamation work while others were Protestant refugees who were encouraged to take up land which had been granted to the "Adventurers". Frequently disputes erupted between the original inhabitants and the newcomers.

Despite the drainage schemes suitable sites for villages and towns were still limited in the Fens. Most of the favorable sites had been occupied during and prior to the Middle Ages. The pattern of villages remained the same although the villages were now further from the coastline than they had been. This was due to deposited silt in the Wash and reclamation along the coastal zone.

River towns such as those discussed in the previous chapter were still important. The estuarine towns had grown at the expense of the border towns because of the difficulty of getting ships as far up the rivers as in previous times. King's Lynn was the major port in the area and in 1801 had a population of approximately 10,000 people. Cambridge, on the Cam River, had a similar population due to its function as a university town.

Transport and Communication

During the sixteenth century the major transport routes were the rivers Witham, Welland, Nene and Ouse. Navigation authorities with interests in the Fenland rivers insisted on the maintenance of adequate levels of water along the rivers for the uninterrupted passage of boats and barges. This was contrary to the desire of the Fenland engineers who wished to keep the water level in inland drains as low as possible so that they would be able to carry water from sudden floods. The construction of sluices in particular hindered navigation. Reports tell of less journeys being possible after large scale drainage of the Fens was commenced. Ships were often forced to wait until floods because the sluices prevented the tide from raising the water level to allow for safe passage.

In the seventeenth and eighteenth centuries Boston was "well frequented" and King's Lynn was a "safe haven which yielded easy access" for shipping but by the nineteenth century both were difficult to reach and accessible only at high tide.

As reclamation took place roads were being improved and the border towns of the Fens were linked to other regional centers. Turnpikes, on which tolls were collected, linked Cambridge and Peterborough with London.

Summary

The period from the sixteenth to the nineteenth century was marked by the first large scale efforts at reclamation. The Fens changed from a region of subsistence activities with some cultivation to a crop growing region aimed at producing a surplus for trade. Reclamation, although providing more land for cultivation, brought about physical problems, as seen in the shrinking of the peat surface, and social problems, as seen in the difficulties associated with the regulation and maintenance of the new works along rivers and the coast.

CHAPTER 4

MODERN TIMES--THE FENS SINCE 1850

The Fenland of the twentieth century is very different to what it was in 1850. Improvements in pumping engines led to more efficient drainage of the land. New efforts were made to grapple with the problem of tidal rivers. There was a recognition that improved administrative machinery must precede engineering success. The extension of market-gardening and of fruit farming into the Fens saved the area from the worst effects of the agricultural depression of the late nineteenth century.

Despite these changes and the fact that the Fenlands are now considered the most extensive area of first-class arable land in England, the same problems that existed in the area prior to 1850 still exist today. Four major problems can be identified: the shrinking peat surface, the maintenance of the river banks, the tidal rivers, and the administration.

Technology

The lowering peat surface is a basic factor that still remains in the drainage difficulties of the Fens. In order to cope with the continual lowering of the surface more powerful pumping units have to be installed to lift water from the surface into drains and then into rivers. Methwold Fen in Norfolk had increasingly larger pumps installed in 1883, 1913, 1928 and 1938 to cope with the problem.

Diesel engines were introduced after 1913 to supplement the steam engines. Now there are very few remaining steam engines in the Fens. Diesel engines can be started up quickly at short notice, and they are much more suitable for intermittent running than steam engines. Today electrically operated pumps are also used to drain the land. The more

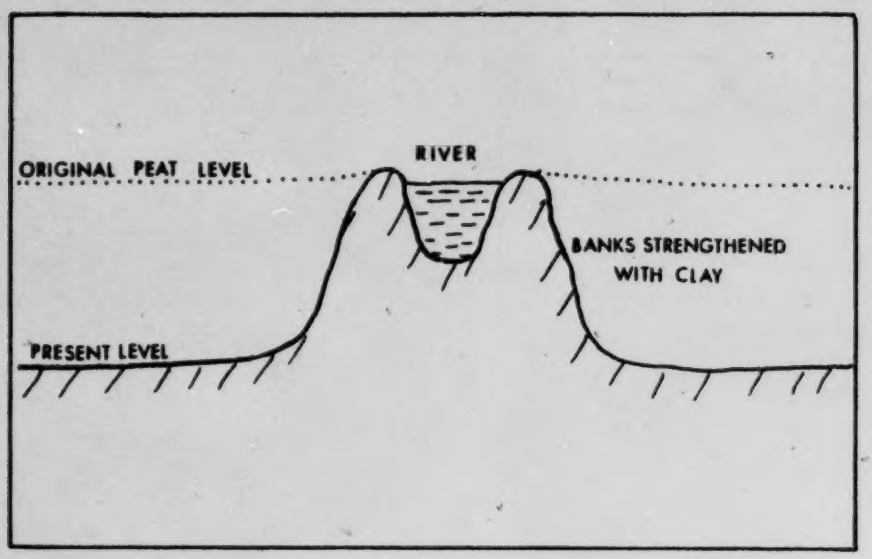

Figure 21. Cross-section of River
Above General Level of the Land

How did such a situation arise? Why were the riverbanks strengthened with clay? What problems were caused by this situation?

efficient drainage has greatly accelerated the rate of shrinkage and wastage, which in turn has resulted in the necessity to lower drains and to alter bridges and culverts. The lowering of the surface has also increased the problems associated with the river banks. Many of the banks were made or repaired in great haste and with inadequate material because there was no good clay available. Today the danger is not so much that of overflowing as of seepage.

As a result of the lowering of the peat surface, two water levels now exist in the Fens. One is the low-level system of the internal drains and the other is the high-level system of the larger rivers that flow through the Fens from the uplands to the sea. The problem of disposing of the water of the low-level drains has been solved by pumping, but the problem of protecting the drained land from the high-riding rivers in time of flood still remains (Figure 21).

Throughout the twentieth century agricultural machinery has advanced considerably and made a great impact upon the farming economy of the Fens. The many-bladed tractor-plough has replaced the wooden plough with iron parts. Drilling machines are used to sow all kinds of seeds and various types of harvesters are used. Most of the machinery is small because the Fens consist of numerous small, intensively cultivated farms, most of which are less than 50 acres in area.

Economy

In the Fens over 80% of the arable acreage is under cultivation. The silt and peat areas both contain soils which are of light texture and after they have been drained they can be worked at most times of the year. About 50% of the cultivated land of the Fens is under cereals, especially wheat, with some barley and oats. The southern Fenland is one of the most important cereal producing areas in England.

Over 30% of the cultivable land of the Fens is used for sugar beets and potatoes. Potatoes are grown primarily as a cash crop but in years when overproduction occurs the surplus is sold for processing or as stock feed. The northern Fenland became a leading potato growing area during the nineteenth century. Yields and quality are high. The Fens also have a readily available casual labor force. The potato harvest occupies half a million men, women and children for 10 days each autumn. Sugar beet is primarily grown for the extraction of sugar, but is also valuable as a source of fodder. The peat Fenland is an important sugar beet growing area and numerous processing factories are found in nearby towns such as Spalding and Ely.

Figure 22. Horticultural Land in the Fens

Once drained the Fens provided excellent conditions for large scale horticultural activities. Why do you think that this was the case?

Figure 23. Church and Tulips at Spalding

Note the location of the church. Why would this site have been selected for such a building? Why are parts of the Fens ideal for growing flowers such as tulips and daffodils?

The proportion of arable land in pasture is now low in contrast to earlier centuries, less than 20%. Grassland is usually confined to the most poorly drained areas and is used for the grazing of animals and the mowing of hay.

The Fenland is one of the most important horticultural regions in England, particularly in terms of the production of vegetables. Over 20% of the arable area is used for horticulture. An interest in horticulture developed in this area during the great agricultural depression in arable farming of the late nineteenth century. The horticultural area is made up of small holdings. Cabbages, broccoli and cauliflowers are especially important on the silt Fens. Carrots and parsnips are grown on the peat Fens. Peas are grown for canning and quick-freezing as well as for drying. The silt Fenland is the major area of production for broad beans and onions. Celery, asparagus and lettuce are also grown in the area. Around the Isle of Ely dry peas are the most important vegetable crop, followed by carrots and celery. In the northern Fens dry peas, cauliflower, peas for canning or freezing, cabbages and broad beans are important (Figure 22).

The growing of daffodils and tulips form an important part of the Fenland economy (Figure 23). The blooms are sent to major cities, especially London, to be sold on the fresh flower market. Small fruits, such as strawberries and gooseberries, are important Fenland crops also sent to the same markets.

The area of orchards in the Fens is not very large because the water table is high and prevented deep rooted trees from surviving. However, in many parts of the Fens glasshouses can be seen. These are used to protect tomato plants from frost.

Livestock are also very important in the Fenland economy. Over twenty percent of total farm revenue from the area is derived from the sale of cattle, poultry and pigs and products obtained from these animals.

Social Organization

During the twentieth century great improvements have been made to the administrative system operating in the Fens. In 1927 a Royal Commission was set up to examine the working of all drainage authorities in England. In its report the Commission described the tangle of authorities working with antiquated powers and inadequate resources. The remedy suggested was the establishment of boards, each with exclusive control over a main river. Boards were set up to control the Great Ouse, the Nene, the Welland and the Witham in 1930. In 1963 the River Boards were reorganized and replaced by River

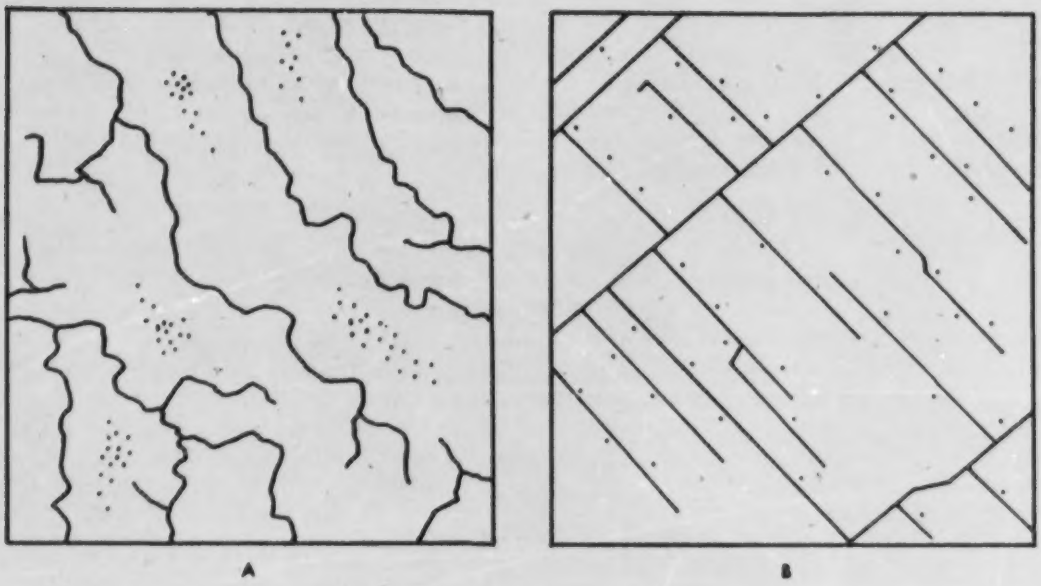

Figure 24. The Settlement and Drainage Pattern on Silt and Peat Lands

A. On the silt lands meandering river courses are common and nucleated villages are located on areas of higher ground.

B. On the peat lands reclamation took place at a later date and the drains display a rectangular pattern. Individual farmsteads are the common settlement type.

Why do you think such different patterns of drainage and settlement developed on the two types of land?

Authorities which had greater powers. Despite these improvements there is still not complete centralization of authority within each river basin and conflicting interests between local drainage boards are always likely to occur.

Population

The most highly populated areas of the Fens are the silt lands. The more recently drained peat lands contain larger farms and are not as heavily populated.

An intensive type of small-scale arable farming dominates the economic life of the Fenlands. Of the total population of the area almost half are directly engaged in agricultural occupations. The intensive small-holding type of agriculture is most common on the silt land; larger holdings and less intensive agricultural activities are more characteristic of the peaty soils.

Settlement Pattern

Two types of settlement pattern are found in the Fens, rural villages and urban towns. The silt Fens and Fen islands contain nucleated villages. On the silt a belt of nucleated villages extend from King's Lynn to Boston. On the peat Fens nucleated settlements are rare. Where they do occur, they are compressed into long lines of houses by a water course on one side and a marsh, such as Upwell, Outwell and the Deepings, on the other. Sometimes small groups of houses are found clustered at bridges. The most common unit of settlement in the peat Fen is the isolated farmstead standing back from the road (Figure 24).

Urban development in the Fenland is limited. All towns occupy sites which in their natural state were better drained than the bulk of the Fens. King's Lynn, once the greatest port in England, is now reduced to limited coastal trade in grain and sugar. After prolonged stagnation, Fenland towns are growing anew. In the last two decades the population of Boston, Spalding, March, Wisbeck and King's Lynn have increased up to 20%.

Transport and Communication

The agricultural life of the Fens depends largely on rapid transport. The successful marketing of perishable commodities subject to rapid variations in price, such as early potatoes, flowers and small fruits, demands speedy transportation facilities. This is now achieved by land transport, such as road and rail, where once the rivers provided the main means of transport.

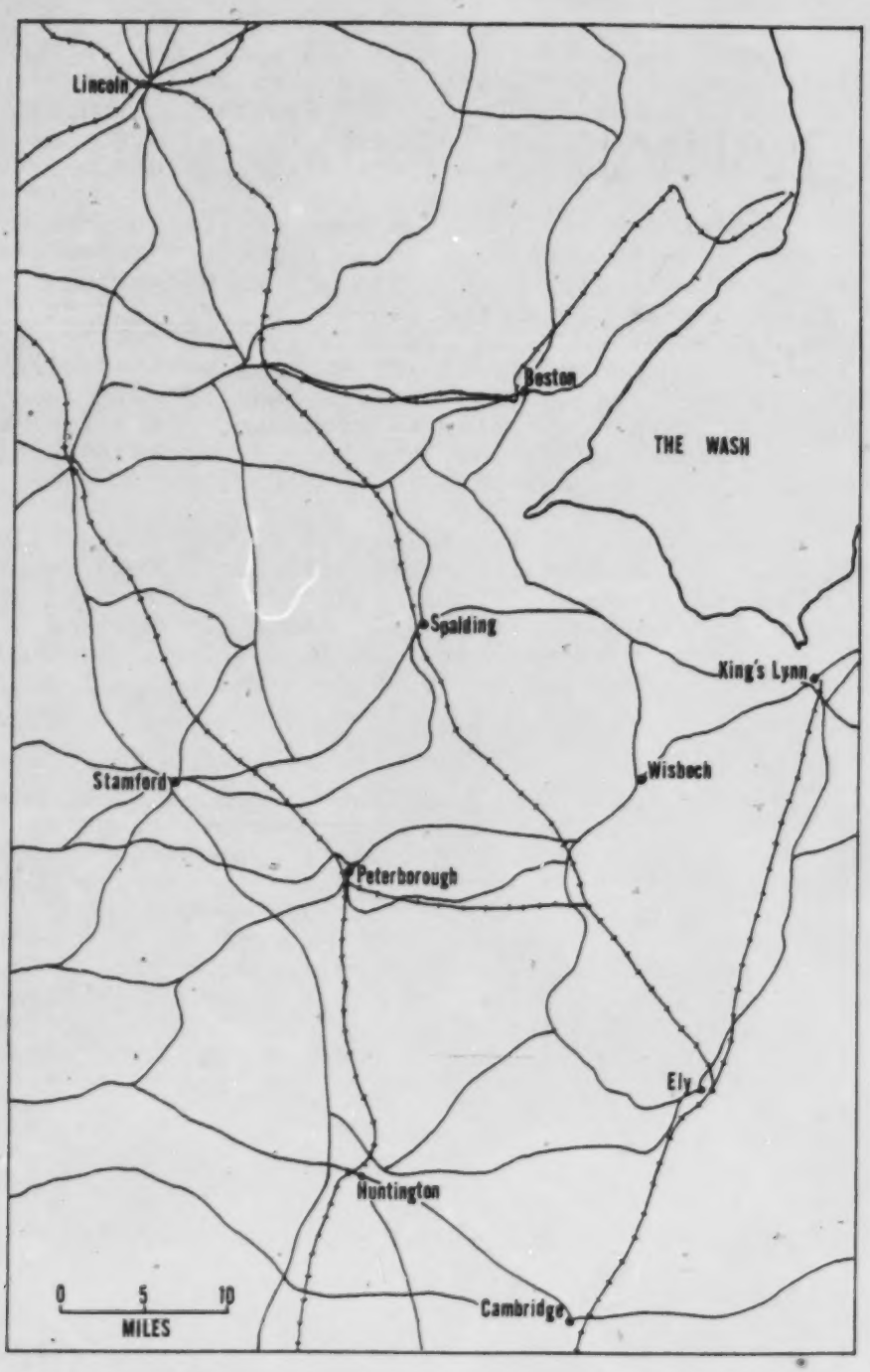

Figure 25. Transport Routes in the Fenland, 1970s

The major roads and rail lines display a very complex pattern of transport which would not have been possible a few centuries ago. Why do you think this is so?

Since 1850 a rail network has been constructed which links the region with London, the industrial centers of Birmingham, Manchester and Leeds, and Scotland. The railroad services have been specially organized to deal with the seasonal nature of much of the specialized produce (Figure 25).

In addition to rail transport the region has a good road system. This is essential for a region so dependent upon agriculture for a livelihood. Roads act as a feeding system to the railroads, and in an independent capacity. The road pattern in different parts of the Fens reflect the drainage patterns. The winding roads of the earlier settled silt lands are above the level of the surrounding land and wind across the countryside like meandering watercourses. The long straight roads of the peat areas reflect the long straight channels constructed to drain the area.

Water transport is still used for agricultural commodities which do not require rapid transport. The major ports are Boston, Fosdyke, Wisbech, Sutton Bridge, and King's Lynn. Wheat is shipped to Hull and London for milling. Seed potatoes are brought in from Scotland and shipped to the Mediterranean area. Bulbs are imported from the Netherlands.

Summary

The Fens have developed into a specialized intensive farming region containing some of the best arable soils in England. Small fruit growing and market gardening is characteristic of the silt Fens. On the peat Fens cereals, particularly wheat, potatoes, and sugar beet are grown.

The silt Fens are the oldest settled portions of the region and the settlement and transportation patterns reflect the meandering drainage. The peat Fens are characterized by straight lines of houses, roads and drains reflecting the large scale reclamation schemes which made cultivation possible.

Improved administration has overcome many of the earlier difficulties associated with the reclamation and maintenance of the Fens although problems still persist.

CHAPTER 5

UNIT SYNTHESIS

This unit began with the objective of telling you about the changes in land use that have occurred in the Fenlands of England since the time it was first inhabited.

Many elements of the physical and cultural landscape have been dramatically changed over a period of more than 4,000 years. The area which was mostly covered by marshes has been drained and only a few swampy areas remain. However, as the drainage took place the peat lands began to shrink and today large rivers flow in channels which are higher than the level of the surrounding countryside. Where reeds and turves were once cut we now find prosperous horticultural farms.

We have seen how the technology of the area has changed. The products of modern technology, in the form of machines, have replaced the stone and wooden implements of the original inhabitants.

The economy and social organization changed from small groups of subsistence hunters, gatherers and fishermen, to the highly organized system of farming during the Middle Ages. Today individual farms dot the landscape, producing grain, flowers, small fruits and vegetables for sale in large cities throughout England as well as other European countries.

The population of the area has changed considerably over time. In the early period of history it appears that more people lived in the Fens during the Bronze Age than at any other time until the Middle Ages. Large scale reclamation schemes in more recent times have encouraged more people to move into the area as new land became available for farming.

Earliest settlement took place upon the "islands" which dotted the Fens. Today, the settlement pattern in the silt areas of the Fens reflects a pattern which developed prior to the sixteenth century with villages scattered along

meandering transport routes. The more recently drained peat areas display a more regular settlement pattern.

Today the area which was once considered virtually inaccessible except along the major waterways is crossed by roads, rail lines and canals.

Each of the changes in these elements has had an impact upon the land use of the area. During Pre-Medieval times we saw land use change from infrequent visits by people to gather fuel and necessary materials and to catch birds and fish, to a settled existence combining cultivation and grazing.

During the Middle Ages monasteries had control over the land use of the Fens and the economy was based upon the native products, such as reeds, fish, pasture and peat as well as agricultural products. Some reclamation and drainage was carried out on a small scale during this period with the monasteries providing the capital and the Fenmen the labor for such projects.

The third stage was marked by a period of large scale reclamation works financed and carried out by people from outside the Fens. The drainage led to an unforseen problem, the lowering of the land surface, which resulted in the frequent flooding of low-lying areas. Technological advances in pumping helped alleviate this problem. However the many authorities controlling different parts of the Fens could not provide a coordinated policy of development.

Recent times have seen the Fens converted into one of the richest farming areas in England with a highly developed transport system to get the produce to the markets.

GLOSSARY

adventurer - a person who, in the 17th century, would provide the money to finance a drainage scheme

alloy - a metal mixed with another metal to give durability. Bronze is an alloy of copper and tin.

Angles - a group of people from western Europe

Anglo-Saxon - a group of people living in England. This group developed as a result of invasion by Angles and Saxons from western Europe.

antiquated powers - regulations that applied in the past but are now out of date

arable land - land that is fit for cultivation by ploughing or tillage

bacterial action - a chemical change caused by bacteria

basin - a large depression in the surface of the land, often filled with sedimentary material

bird lime - a substance spread on twigs to trap small birds

bondman - a person who is a slave or a serf

border towns - towns located at the edge of the Fen and the upland area

brine - salty water

bronze - a metal made from a mixture of copper and tin

cash crop - a crop that is grown for sale

causeway - a roadway built up above wet ground or water

centralization of authority - placing the power of control in the hands of a few groups of people

chalk - limestone rock

chicory - a thick-rooted herb used as a salad plant

claying - Bringing clay to the surface of the ground. Trenches two feet wide were dug across fields until clay was reached. Clay was then dug out and spread for four yards on either side of the trench.

cole-seed - seeds of plants such as broccoli, Brussel sprouts, cabbage and cauliflower

common pasture - an area of land used by all members of the village, or by several villages, as grazing land

communal farms - farms that are worked by a number of families

dikes - banks, usually of earth, constructed to control or confine water

disintegrate - to break down

dispossessed Fenmen - people who lost their homes and land

Domesday Inquest - a type of census carried out in part of England under the order of William the Conqueror in 1086

drilling machines - a planting implement that makes holes or furrows, drops in the seeds and sometimes fertilizer, and covers them with earth

embankment - a raised structure to hold back water

enclosure - the fencing off of common land into individual fields

estuary towns - towns found in the zone where salt water from the sea met freshwater from a river

fen - low-lying land which is partially or completely covered with water

Feudalism - a system of political organization operating in the Middle Ages (see Manorial System)

flax - a slender plant with blue flowers usually grown for its fiber and seed. It is used to make linen.

fowling - catching wild birds

freeman - a person who is not a slave or a serf

gradient - the slope of the land

hemp - a plant whose fibers are used for making rope

horticulture - the growing of fruits, vegetables and flowers

Ice Age - a time when huge ice sheets covered much of the land surface of the earth, especially in the Northern Hemisphere

implements - tools or utensils forming part of equipment for work

intensively cultivated farms - those farms on which every available piece of land is used for the growing of crops

intercommoning - several villages using the same piece of pasture land

Jurassic - a geologic period that began about 190 million years ago and lasted for about 54 million years

light-textured soils - soils that are easy to work

manorial system - a system of territorial organization used in the middle ages. A manor consisted of an estate under a Lord who had many rights over the land and the people who lived on the land.

market gardening - growing vegetables to be sold at market

marsh - soft, wet land

meadow - an area of level grassland

meandering water-courses - rivers, creeks, canals and drains that wind across the land

medieval - relating to the middle ages and marked by the rise of Christianity and the decay of feudalism. In this unit it is taken to be that period of time between 1086 and the beginning of the 16th century.

merchant ships - ships used in trade and commerce

monasteries - places where monks or members of religious orders lived

monastic estates - land belonging to monasteries

nucleated village - a small settlement consisting of buildings close together

outfall - the mouth of a river

paring and burning - the practice of burning the rushes and reeds of the peat lands, after they had been dried and heaped. The ashes were then spread on the land and the farrow was burnt.

pastoral existence - a way of life based on the raising of livestock

peat - a spongy brownish substance composed of partially decayed plant materials accumulated in swamps, sometimes used as a domestic fuel

pike - a stick with a sharp point or spike

pit-dwelling - type of house used by people of the Fenland during the Stone Age. It consisted of an excavation of about three feet in depth, varying from six to twenty feet in diameter. A tree trunk supported the roof which was made from large boughs covered with turf.

polder - land reclaimed from the sea

population density - the number of people living on each square mile of area

pulse - the edible seeds of leguminous crops such as peas and beans

Quaternary - the latest period of geologic time (the past 2½ million years)

reclamation scheme - a plan for reclaiming the marsh land to a usable state

rotation of crops - the growing of a sequence of crops on the same piece of land in order to maintain fertility of the soil

royal commission - a group of people appointed by the King to investigate a problem

rushes - tufted marsh plants often having hollow stems which are used in making thatch for roofs

salt pan - land sometimes covered by salt water. When the water evaporates, the salt remains

Saxons - a group of people from western Europe

sea-bank - a wall constructed along the coastline to keep the sea from covering the land at high tide

sedge - tufted marsh plants with solid stems

sediment - particles of soil and sand carried along in water

serf - a person who did not have the use of any land. He worked for a nobleman or the church.

shrinkage - the lowering of the land surface

sickle - an agricultural implement consisting of a curved metal blade with a short handle; used for cutting hay at harvesting time

silt - sedimentary material of small size laid down in the Fens under salt water

sledge - a type of sleigh used for carrying loads

sluices - floodgates that help control the flow of water in a stream or river

small fruit growing - the growing of strawberries and gooseberries

subsistence - the minimum amount of material goods that a person or group must have in order to survive

systematic settlement - the inhabiting of an area in a planned manner

terrain - the physical features of a piece of land

thatched roof - a roof made of reeds or straw

topography - the shape of the land surface

town land - a ridge of higher land reclaimed from the sea providing suitable sites for settlement

traditional occupations - jobs that have been carried on for centuries

turbary - ground where turf or peat may be dug, especially for fuel

turf - a piece of peat dried for fuel, or used for roofing (plural; turves)

undertaker - a person who, in the 17th century, organized reclamation work

unforeseen problem - a difficulty that was not expected or anticipated

uplands - higher ground surrounding the Fens above the level of the marshes

villein - a person who lived in a village and worked land that had been granted to him

wastage - the lowering of the land surface by shrinking

wattle and daub - a framework of woven sticks covered with clay

windmill - a mechanical device driven by the wind and used to pump water

woad - an herb of the mustard family grown for its blue dye

yeoman farmer - a small independent farmer

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CHANGING LAND USE:

THE FENS OF ENGLAND

A Case Study in Land Reclamation

Student Work Book

by Kevin Laws

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April, 1978

FOREWORD

The workbook provides recall exercises to assist students master the content of the text relating to changing land use in the Fens of England. These exercises are an application of Thorndike's laws of exercise and effect, which still remain significant aspects of effective teaching and learning. Mastery of the facts, concepts, and generalizations is a prerequisite to transfer learning.

The excitement of successful instruction nevertheless goes beyond the recall of specific concepts, facts, and generalizations based on a particular text. What is sought is transfer -- the ability to apply the knowledge to situations; to see relationships and order in new data using previously learned constructs; to make valid inferences from new situations applying principles of deduction and induction acquired in previous learning.

It is the teacher, familiar with the growth of pupils and the local community, who can most aptly extend the art of teaching through principles of transfer learning. While a curriculum developer can write recall exercises and contrive some opportunities for transfer, it is the alert teacher who forces students to apply knowledge to transfer situations.

The list of activities included under "Note To The Teacher" will assist teacher and student to devise activities which arouse their curiosity, reflect their interests, and permit them to apply principles of changing land use, studied in connection with the Fens, to other places and other times.

It is not proposed that students will have the time to do all of the suggested or analogous activities, individually or as a class. It is recommended, however, that some of these or similar activities be utilized. Some are particularly adapted to individual, others to group work. The incorporation of such activities, however, will encourage students to extend concepts, facts, and generalizations learned in connection with the study of the Fens of England to other places and other times. It is the practice of transfer learning that elevates specific learning to a wider intellectual horizon.

NOTE TO THE TEACHER

The systematic study of an area like the Fenlands of England can lead to many transfer learnings. However, in most instances these must be initiated by the teacher. This workbook contains questions which relate specifically to the content of the textbook, but suggestions for additional activities which you may wish to utilize follow.

1. Take a local area and identify the different types of land use that have occurred since human settlement began. Arrange the land uses into stages and specify the time periods during which each stage operated in the area. Identify the characteristics of each stage using the headings utilized in this unit if they are applicable. Try to find out why the different stages came about.

2. Make a comparative chart showing the stages of land use in the Fens and the local area selected above. Other units in historical geography which form part of the Geography Curriculum Project could also be used. These units are Changing Land Use: Peachtree Street, Atlanta and Changing Land Use: The Back Lachlan District of Semi-Arid Eastern Australia and can be obtained from the Geography Curriculum Project, Dudley Hall, University of Georgia, Athens, Georgia 30602.

Questions to be asked after the comparative chart has been compiled include:

Did each area go through similar stages? Why or why not?

What characteristics of similar stages were the same or different in each area? Why?

How long did each stage last in each area? Are these the same or different? Why?

3. Make a large map of the Fens, and other areas, with overlays showing idealized land use by each of the periods.

4. The study of the Fens can form the underlying theme for the study of the history of mankind. For example, when dealing with each of the time periods, such as the Stone Age the Bronze Age, the Middle Ages, etc., further study of each can be done by comparing how each age was similar or different in different parts of the world.

5. Alternatively, the study of the history of mankind can be supplemented by using the Fenlands of England as a case study of world-wide processes operating in a specific area.

6. Visit or study areas where man has modified the natural environment through the use of technology, irrigation, drainage, filling-in, etc. Try to find out why these changes were made. Places which could be studied include the Polders of Holland, irrigation in the California Delta, land reclamation in Japan, the Tennessee Valley Authority. An excellent scholarly collection of articles is found in W. L. Thomas, Man's Role in Changing the Face of the Earth; University of Chicago Press, 1956.

7. Make a collection of "before" and "after" drawings, pictures, or photographs about changes in land use or reclamation.

8. Arrange for the members of the class to have a debate on the following topic, or one like it: Technology is more important than management in schemes of land reclamation.

Divide the class into two teams; have each team collect as much evidence as possible. Summarize evidence and outline a position. Have each member of the teams write an essay on the topic. Select speakers from each team to debate the issue.

9. Have students examine the impact of the idea of ecology and environment, and the rise of the "wilderness" concept. Discuss the following:

If such an idea had prevailed in the nineteenth century, would the Fens have been reclaimed as farmlands?

What has happened in Florida when builders and developers have tried to reclaim marsh and sea land? (See articles about this issue in The National Geographic Magazine, January, 1972; August, 1976.)

The National Geographic has also had articles on the wilderness concept. Some of them are:

Alaskan Family Robinson; January, 1973

America's Wilderness: How Much Can We Save?; February, 1974

Escalante Canyon - Wilderness at the Crossroads; August, 1972

John Muir's Wild America; April, 1973

Mexico to Canada on the Pacific Crest Trail; June, 1971

Preserving America's Last Great Wilderness; June, 1975

Yellowstone at 100: A Walk Through the Wilderness; May, 1972

10. Have students investigate the situation where the level of land use has deteriorated as a decline of culture and civilization has taken place. Try to determine the causes for the deterioration and decline. Examples which could be studied include:

Aztec Culture of Mexico (see National Geographic, October, 1968; May, 1973)

Maya of Nuclear America (see National Geographic, November, 1974; December, 1975)

Incas of the Andes (see National Geographic, February, 1971; December, 1973)

Roman Culture in North Africa

Khymers of Southeast Asia (see National Geographic, April, 1960; March, 1971)

The decline of the rice culture in the southeastern United States

11. There are very few books written about the Fens but the following can be useful for additional information although they are difficult to understand:

Darby, H.C., The Draining Of The Fens. Cambridge: Cambridge University Press, 1968.

Darby, H.C., The Medieval Fenland. Newton Abbot: David and Charles, 1974.

Darby, H.C., An Historical Geography of England Before 1800. Cambridge: Cambridge University Press, 1936.

Grigg, D. The Agricultural Revolution in South Lincolnshire. Cambridge: Cambridge University Press, 1966.

Hallam, H. E. Settlement and Society: The Study of Early Agrarian History of South Lincolnshire. Cambridge: Cambridge University Press, 1965.

Seebohm, M. E. The Evolution of the English Farm. London: George Allen & Onwin, 1952.

Stamp, D. L. The Land of Britain: The Report of the Land Utilization Survey of Britain; Eastern England. Vol 7. London: Geographical Publications, 1937.

Interesting descriptions of life in early times can be found in:

Briggs, Asa How They Lived: An Anthology of Original Accounts Written Between 1700 and 1815. Vol. 3. Oxford: Basil Blackwell, 1969.

Harrison, M. and Royston, O. M. How They Lived: An Anthology of Original Accounts Written Between 1485 and 1700. Vol. 2. New York: Barnes and Noble, 1964.

Hassall, W. O. How They Lived: An Anthology of Original Accounts Written Before 1485. Vol. 1. Oxford: Basil Blackwell, 1962.

UNIT INTRODUCTION

1. Define, give examples, and use the following terms in oral or written sentences:

reclaimed, reclamation_____

_____

_____

marsh_____

_____

_____

polder_____

_____

_____

fen_____

_____

_____

diked_____

_____

_____

encroaching_____

_____

_____

moored_____

_____

cast

resistant Jurassic rock

Quaternary Ice Age

subside

Fen "island"

basin

silt

peat

severe

_____

_____

sediment_____

_____

_____

inhabitation_____

_____

_____

2. Where are some of the richest and most productive farm lands of England found?

3. Was this land always available for farming? Why or why not?

4. What two meanings does the word "fen" have?

5. Describe the location and size of the English Fens.

6. How were the English Fens formed?

7. What three land types are found in the Fens? How does each differ from the others?

8. Why is the Wash gradually growing smaller?

9. What four stages have been used to organize the changes that have occurred in the Fens? Fill in the following table.

	Stage	Time Period
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____

10. What other areas are similar to the Fens?

CHAPTER 1. THE PRE-MEDIEVAL LANDSCAPE - BEFORE 1086

1. Define, give examples, and use the following terms in oral or written sentences:

pre-Medieval _____

_____

_____

age _____

_____

_____

invading group _____

_____

_____

2. What six "ages" and periods occurred during pre-Medieval times?

<u>The Stone Age. To 2000 B.C.</u>

1. Define, give examples, and use the following terms in oral or written sentences.

pit-dwelling _____

_____

_____

excavation _____

bough _____

turf _____

domesticated animal _____

venture _____

2. Were the Fens permanently settled during the Stone Age? Where did the people live?

3. What did a pit-dwelling look like?

4. How did Stone Age people get enough food to survive?

5. How did they use the Fenlands?

The Bronze Age. 2000 to 500 B.C.

1. Define, give examples, and use the following terms in oral or written sentences:

bronze _____

_____

_____

Europe _____

_____

_____

natural protection _____

_____

_____

pastoral existence _____

_____

_____

pluck _____

_____

_____

sledge _____

_____

_____

plough_____

sickle_____

furrow_____

2. Were the Fens permanently settled during the Bronze Age? Where did the people live?

3. What advantages did the Fens provide for settlement?

4. What disadvantages did the Fens have for settlement?

5. What agricultural tools did the Bronze Age people have?

6. What animal began to play an important part in the way of life of the Bronze Age people? Why?

7. Describe the way of life of the Bronze Age people. How did they obtain the food they needed?

The Iron Age. 500 B.C. to 100 A.D.

1. Define, give examples, and use the following terms in oral or written sentences:

B.C. _____

_____

A.D. _____

_____

chalk upland _____

_____

_____

thatched roof _____

_____

_____

coinage _____

_____

_____

farm implement_____

_____

_____

2. Where did people live during the Iron Age? Why did they move from marshy areas?

3. From where did Stone Age people come to Britain?

4. Describe an Iron Age dwelling? How did it differ from a Stone Age dwelling?

5. How did Iron Age people get food for their needs?

6. What improvements were made to farming tools during this Age?

7. Why was iron better than bronze for making weapons and tools?

The Roman Conquest. 50 B.C. to 450 A.D.

1. Define, give examples, and use the following terms in oral or written sentences:

conquest _____

_____

_____

Celtic tribe _____

_____

_____

technology _____

_____

_____

sea-bank _____

_____

_____

inland dike _____

_____

_____

causeway _____

_____

_____

seasonally flooded _____

_____

_____

2. Did the Romans live in the Fenlands?

3. What was Ermine Street and why was it important?

4. What did the Romans do to reclaim some of the seasonally flooded areas of the Fens?

5. What did people who lived in the Fens during this period do to make a living? Which land type did they use?

The Saxon Invasion. 500 A.D. to 1086 A.D.

1. Define, give examples, and use the following terms in oral or written sentences:

Germanic people _____

_____

_____

invade, invasion _____

_____

_____

merge _____

_____

Christianity

impact

solitude and contemplation

monk, monastery

eel

infested with devils

manifold horrors and fears

hallucination

2. How did the Anglo-Saxon people develop?

3. What use did these people make of the Fens?

4. What happened to the Fenlands which had been reclaimed by the Romans? Why?

5. Why were the Fens lightly populated? How much more land did the people living in the Fens need compared to people living in upland areas?

6. What impact did Christianity have upon the Fens?

7. What did people think of the Fens during this period?

The Danish Invasions. 9th Century

1. Define, give examples, and use the following terms in oral or written sentences.

systematic settlement _____

_____

_____

great heathen army _____

_____

_____

plunder _____

_____

_____

revival _____

_____

_____

centuries _____

_____

_____

sparsely settled _____

_____

_____

2. Did the Danes live in the Fens? What did they do in the Fens?

3. What activities took place in the Fens during Anglo-Danish times?

Summary

1. Define, give examples, and use the following terms in oral or written sentences.

interior _____

_____

_____

maintained _____

_____

_____

2. Fill in the following table to explain what use the different groups of people made of the Fens.

Period	Did they live in the Fens?	What activities were carried on in the Fens?
Stone Age		
Bronze Age		
Iron Age		
Roman Conquest		
Saxon Invasion		
Danish Invasion		

3. During which period would you have preferred to live? Why?

CHAPTER 2. THE MIDDLE AGES - 11th TO 15th CENTURY

1. Define, give examples, and use the following terms in oral or written sentences:

economy _____

_____

_____

social organization _____

_____

_____

population _____

_____

_____

settlement pattern _____

_____

_____

transport and communication _____

_____

_____

Domesday Inquest _____

_____

_____

levy _____

_____

_____

Medieval _____

_____

_____

2. Why is more known about the Fens in this period of history than in pre-Medieval times?

3. What did not happen in Britain in the Middle Ages that happened a number of times in the earlier stage?

4. Did the Fens change much during the Middle Ages? Describe the appearance of the Fens during this stage.

Technology

1. Define, give examples, and use the following terms in oral or written sentences:

reclamation _____

_____

_____

sluice _____

_____

_____

divert_____

_____

_____

agricultural technique_____

_____

_____

pastoral farming_____

_____

_____

2. What technological developments tcok place during the Middle Ages which led to the reclamation of parts of the Fens?

3. How did agriculture during the Middle Ages differ from early farming activities?

Economy

1. Define, give examples, and use the following terms in oral or written sentences:

terrain_____

turves

fowling

pike

currency

brine spring

turbary

meadow

arable land

embankment _____

_____

_____

pulse _____

_____

_____

amphibious _____

_____

_____

islet _____

_____

_____

bird lime _____

_____

_____

2. Why was life in the Fens different from life in the upland regions of England?

3. Three different land types were found in the Fens. Fill in the following table to show how different activities took place in each of them.

Land Type	Products and Activities

4. What was used as a form of currency?

5. How did many inhabitants of the Fens earn their living from the birds that lived in the area?

6. What was salt used for?

7. Why were meadows very important?

8. How have many people described the way of life of the Fen people during the Middle Ages. Why do these descriptions only tell part of the story?

Social Organization

1. Define, give examples, and use the following terms in oral or written sentences:

manorial system_____

_____

common people

status

villein

serf

common land

overseer

freeman

bondman

intercommoning_____

_____

_____

2. What was the manorial system and how did it operate?

3. How was the use of the Fens controlled? What was controlled?

Population

1. Define, give examples, and use the following terms in oral or written sentences:

plough team_____

_____

_____

population density_____

_____

_____

midlands_____

_____

_____

uplands_____

_____

_____

2. Why did more people live on the uplands than on the Fenlands?

3. Why did more people live in the Southern Fens than in the Northern Fens?

Settlement Pattern

1. Define, give examples, and use the following terms in oral or written sentences:

topographical differences_____

_____

_____

no stable foundations_____

_____

_____

heaving motion_____

_____

_____

absorbed _____

_____

_____

infilling _____

_____

_____

alignment _____

_____

_____

2. Describe the settlement pattern in the Fens during the Middle Ages.

3. Why were silt areas better for settlement than peat areas?

Transport and Communication

1. Define, give examples, and use the following terms in oral or written sentences:

inaccessibility _____

_____

commercial avenues

border town

estuary town

causeway

gradient

reroute

2. Why is marsh so difficult to cross?

3. Name the five major rivers that crossed the Fens and the border and estuary towns located near them.

River	Border Town	Estuary Town

4. Why were these rivers so important?

5. What problems were experienced at the mouths of the rivers?

Summary

1. Define, give examples, and use the following terms in oral or written sentences:

poverty stricken _____

_____

_____

focus of trade _____

_____

2. Choose one land type in the Fens and describe what it would have been like to live there during the Middle Ages.

CHAPTER 3. RECLAIMING THE LAND - 16th CENTURY TO 1850

1. Define, give examples, and use the following terms in oral or written sentences:

disintegrate_____

_____

_____

dissolved_____

_____

_____

yeomen farmers_____

_____

_____

enclosure_____

_____

_____

amalgamation_____

_____

_____

decades_____

_____

_____

impoverished_____

_____

_____

2. What was the greatest change in the Fenland during this stage?

3. Why was it difficult to get money to reclaim the land after the monasteries had been dissolved?

Technology

1. Define, give examples, and use the following terms in oral or written sentences:

sediment_____

_____

_____

tidal river_____

_____

_____

sluggish_____

_____

_____

bacterial action_____

_____

_____

wastage_____

_____

_____

differential shrinkage of silt and peat_____

_____

_____

inundated_____

_____

_____

windmill_____

_____

_____

desolation_____

_____

_____

2. What was Vermuyden's scheme to drain the Fens?

3. What did Vermuyden fail to take into consideration which became a problem in later years?

4. Why did the land shrink? Which land type shrank most?

5. For what purpose were windmills used? Why were they not as good as steam or diesel engines?

6. Why was there early opposition to the windmill?

7. Describe the Fens after drainage had taken place.

Economy

1. Define, give examples, and use the following terms in oral or written sentences:

consolidated_____

_____

_____

woad_____

_____

_____

paring and burning_____

_____

_____

rotation of crops_____

_____

_____

claying_____ _____

_____

_____

solidity_____

_____

_____

2. What two kinds of land were found in the silt area and what were they used for?

Kind of Land	Use

3. What techniques were used to make the peat land useful for farming after it had been drained?

4. What crops were important in the Fens during this period?

5. How did the farm of this period differ from the farm of the Middle Ages?

Social Organization

1. Define, give examples, and use the following terms in oral or written sentences:

fringes _____

_____

_____

specialization _____

_____

_____

wheelwright _____

_____

_____

traditional occupations _____

_____

_____

subsistence _____

_____

_____

responsibilities _____

_____

_____

obligations _____

_____

_____

maintenance _____

_____

authority

conflict of interests

Adventurer

Undertaker

dispossessed Fenmen

2. What changes in village and farm activities occurred after the sixteenth century?

3. How did the division of responsibility for the maintaining of drainage structures lead to problems?

4. What was done to reduce the number of groups who looked after drainage structures?

5. How were drainage projects financed during this stage?

6. Why did large scale drainage schemes often lead to trouble with the local inhabitants?

Population and Settlement Pattern

1. Define, give examples, and use the following terms in oral or written sentences:

cathedral _____

_____

_____

Protestant refugee _____

_____

_____

2. Describe the settlement pattern during this stage. Where were most villages located?

3. Why was the population density greatest in the southern Fens?

4. Why did new settlers come to the Fens from Western Europe?

5. Why were the villages that were found in the Fens in 1086 further from the Wash by 1850?

6. Why did estuarine towns grow at the expense of border towns once large scale reclamation had taken place?

Transport and Communication

1. Define, give examples, and use the following terms in oral or written sentences:

uninterrupted passage_____

contrary

hinder

toll

turnpike

2. What was the dispute about the water level in rivers and drains between navigation authorities and Fenland engineers? Why did each group have different ideas?

3. Why did road transport become important during this stage?

Summary

1. Define, give examples, and use the following terms in oral or written sentences:

   subsistence activities_____

   _____

   _____

2. What were the drained areas of the Fens used for during this stage?

3. What physical and social problems arose because of the drainage of the Fens?

CHAPTER 4. THE FENS SINCE 1850

1. Define, give examples, and use the following terms in oral or written sentences:

grapple_____

_____

_____

precede_____

_____

_____

market gardening_____

_____

_____

agricultural depression_____

_____

_____

extensive area_____

_____

_____

2. What are the four major problems that exist in the Fens today?

Technology

1. Define, give examples, and use the following terms in oral or written sentences:

seepage_____

_____

_____

drilling machines_____

_____

_____

intensive cultivation_____

_____

_____

2. What was necessary as a result of the continual shrinkage of the land?

3. What is the greatest danger associated with high level river channels?

4. Why do two water levels exist in the Fens?

5. State some of the advances in agricultural machinery that have taken place since 1850.

Economy

1. Define, give examples, and use the following terms in oral or written sentences:

arable_____

_____

_____

cereals_____

_____

_____

sugar beet_____

_____

_____

horticulture_____

_____

_____

small fruits_____

_____

_____

2. What are some of the most important products from the Fens?

3. What horticultural products are grown on the silt and peat lands?

Silt Lands	Peat Lands

4. Why is the growing of fruit trees not very important in the Fens?

5. What animals are important to the Fenland economy?

Social Organization

1. Define, give examples, and use the following terms in oral or written sentences:

Royal Commission_____

antiquated powers

exclusive control

centralization of authority

2. What improvements to the administration of the Fens have been made during the twentieth century?

3. Have these improvements solved all the problems of the area?

Population

1. What part of the Fens is most highly populated?

2. Where are the larger farms found?

3. How would you describe the type of farming carried on in the Fens today?

Settlement Pattern

1. Define, give examples, and use the following terms in oral or written sentences:

rural village_____

_____

_____

urban town_____

_____

_____

nucleated village_____

_____

_____

isolated farmstead_____

_____

_____

stagnation_____

_____

_____

2. What types of villages are found in the Fens and where is each type likely to occur?

3. Why is urban development limited in the Fenlands?

4. Describe the settlement and drainage pattern on silt and peat areas of the Fenlands. Why did such different patterns develop on the two types of land?

Transport and Communication

1. Define, give examples, and use the following term in an oral or written sentence:

   perishable commodities_____

   _____

   _____

2. How have the means of transport in the Fens changed since the Middle Ages?

3. Complete the following table to show what goods are carried by different means of transport.

Road and Rail	Water

4. How does the road system reflect the land type?

5. Would the complex pattern of roads and rail lines which exist today have been possible a few centuries ago. Why do you think so?

Summary

1. What sort of farming region is the Fens today?

2. Describe the difference between the products, settlement pattern, transportation pattern, and drainage pattern on silt lands and peat lands.

CHAPTER 5. UNIT SYNTHESIS

1. Define, give examples, and use the following terms in oral or written sentences:

turves _____

_____

_____

reclamation scheme _____

_____

_____

Middle Ages _____

_____

_____

meandering _____

_____

_____

inaccessible _____

_____

_____

unforeseen _____

_____

_____

2. Complete the table to the following table to show how land use in the Fens has changed.

	Time Period	Main Land Use
Pre-Medieval		
Middle Ages		
Reclaiming the Land		
Modern Times		

3. During which stage would you have liked to live in the Fens? Give reasons for your choice. What would life have been like during the stage you chose?

4. Complete the chart on the following page. This chart summarizes the major points from the entire unit. If you do not have enough space on the chart, use extra paper to make up your own chart. Your summary should be as complete as you can make it.

	Technology	Economy	Social Organization	Population	Settlement Pattern	Transport and Communication
Pre-Medieval landscape (before 1086)						
Middle Ages 11th-15th Centuries						
Reclaiming the Land 16th Century to 1850						
Modern Times since 1850						